DOCUMENT RESUME

ED 187 829 CE 016 820

TITLE Adult Competency Education Kit. Basic Skills in Speaking, Math, and Reading for Employment. Part B: ACE Job Analysis and Instruction Manual; Interview Form.

INSTITUTION San Mateo County Office of Education, Redwood City, Calif. Career Preparation Centers.

SPONS AGENCY California State Dept. of Education, Sacramento. Bureau of Adult Education.; Office of Education (DHEW), Washington, D.C.

PUB DATE Sep 77

NOTE 102p.; Parts of this document will not reproduce well due to poor print quality. For related documents see CE 016 818-836.

EDRS PRICE MF01/PC05 Plus Postage.

DESCRIPTORS *Adult Basic Education; Adult Vocational Education; *Basic Skills; Communication Skills; *Competency Based Education; *Diagnostic Teaching; Field Interviews; Individualized Instruction; Instruction; *Job Analysis; Job Skills; Mathematics; *Occupational Information; Program Development; Reading Skills; Student Evaluation; Teaching Guides; Teaching Methods

IDENTIFIERS Adult Competency Education Project

ABSTRACT

This second of three how-to manuals in the Adult Competency Education (ACE) Kit contains the ACE Job Analysis and Instruction Manual and an interview form. The manual presents methods for developing and using ACE job descriptions. The section on creating the job description discusses selecting a job for analysis, interviewing employees, and constructing the job description. Focus of the next section is use of the job description, including diagnostics and program structuring through intake testing, job skill assessment, student competency profile development, reading level determination, and management techniques (contracts, assignment sheets, and records). The section on instruction discusses pretesting and teaching methods used: ACE file (compilation of worksheets), individualizing materials, A.O.K. (attending, organization, and knowledge) for teaching reading, workshops, real-life materials, and manipulatives. The final section on evaluation of student progress discusses posttesting, reviewing, reassessing job skills, and exit testing. A bibliography of instructional materials is provided. Appended exhibits include methodology for locating key entry-level occupations, description of A.O.K., and sample materials, such as pages from a job description, student competency profile, assignment sheet, time card, and math and reading exercises. An eleven-page employee interview form concludes the document. (Also available in ERIC are other manuals, the project final report, and job descriptions--see Note.) (YLB)

ED187829

san mateo county office of education

San Mateo County Office of Education
333 Main Street
Redwood City, CA 94063
(415) 364-5600

a project of the career preparation centers

Adult Competency Education kit

BEST COPY AVAILABLE

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

William K. Jennings

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

PART B

ACE Job Analysis and Instruction Manual
Interview Form

BASIC SKILLS IN SPEAKING, MATH, AND READING FOR EMPLOYMENT

Products and Processes
Developed by the
Adult Competency Education Project
Director, Joe Cooney

CE 016 820

ADULT COMPETENCY EDUCATION KIT TABLE OF CONTENTS

ACE Final Report (CE 016 818)

PART A (CE 016 819)
Introduction to ACE Kit 1
Table of Contents 6
Flowchart of ACE Student Process 7
ACE Counseling Manual 9

PART B (CE 016 820)
ACE Job Analysis and Instruction Manual 99
Interview Form 169

PART C (CE 016 821)
Taxonomy of Instructional Objectives 181
How to Develop Instructional Materials 239
Bibliography 241
Student Competency Profiles 265
Student Assignment Sheets 269
Matrix of Academic Skills 317
ACE Slide/Tape Script 321

PART D (CE 016 822)
ACE COMPETENCY BASED JOB DESCRIPTIONS:
#2 - Child Care Attendant 333
#4 - Guard 349
#8 - Medical Assistant 365

PART E (CE 016 823)
#11 - Groundskeeper 381
#12 - Animal Keeper 405
#15 - Tire Repairperson 411
#16 - Muffler Installer 423
#17 - Garage Mechanic 439

PART F (CE 016 824)
#20 - Body Fender Mechanic 469
#21 - New Car Get-Ready Person 495

PART G (CE 016 825)
#22 - Refrigerator Mechanic 515
#24 - Motorcycle Repairperson 559

PART H (CE 016 826)
#25 - Household Appliance Mechanic 583
#26 - Lineworker 611
#27 - Painter Helper, Spray 633
#28 - Painter, Brush 641
#29 - Carpenter Apprentice 645

PART I (CE 016 827)
#30 - Roofer Apprentice 653
#31 - Pipefitter 669
#32 - Medical Supply Clerk 675
#33 - Stock Clerk 681
#35 - Warehouseman (Laborer, Stores) 711

PART J (CE 016 828)
Sales Core Job Description 723
#36 - Sales, Automotive Parts 737
(see also Sales Core Job Description 723)
#37 - Sales Clerk 757
(see also Sales Core Job Description 723)
#38 - Salesperson, Garden & Housewares 771
(see also Sales Core Job Description 723)
#39 - Salesperson, Women's Garments 785

PART K (CE 016 829)
#40 - Salesperson, Automobile 801
(see also Sales Core Job Description 723)
#41 - Salesperson, Men's Wear 819
(see also Sales Core Job Description 723)
#42 - Waiter/Waitress 833
#45 - Janitor 851
#46 - Porter 859
#48 - Pressing Machine Operator 871

PART L (CE 016 830)
#52 - Maid 879
#54 - Ticket Agent 899
#55 - Cosmetologist 905
#57 - Counterperson 923
#58 - Cook Helper 927
#59 - Kitchen Helper 943

PART M (CE 016 831)
#60 - Food Assembler 955
#61 - Injection Molder - Machine Operator 967
#62 - Data Entry Typist 985
#63 - Institutional Cook 1001
Office Core Job Description 1025
#64 - Clerk Typist 1041
(see also Office Core Job Description)

PART N (CE 016 832)
#65 - Typist I 1049
(see also Office Core Job Descrip. 1025)
#67 - Grocery Checker 1057
#68 - File Clerk 1065
#69 - Receptionist 1087
(see also Office Core Job Descrip. 1025)
#70 - Bank Teller 1091
#71 - Clerk, General Office 1105
(see also Office Core Job Descrip. 1025)

PART O (CE 016 833)
#72 - Ward Clerk 1111
#73 - Account Clerk 1141
#74 - Mail Handler (Messenger) 1167
#75 - Payroll Clerk 1181

PART P (CE 016 834)
#77 - Secretary 1199
(see also Office Core Job Descrip. 1025)
#78 - Keypunch Operator 1203
Assembly Worker Core Job Description 1213
#82 - Electronics Assembler 1223
(see also Assembly Worker Core 1213)
#83 - Printed Circuit Assembler 1237
(see also Assembly Worker Core 1213)
#84 - Micro Electronics Assembler 1247
(see also Assembly Worker Core 1213)
#85 - Chassis Assembler 1255
(see also Assembly Worker Core 1213)
#87 - Machinist Apprentice 1263

PART Q (CE 016 835)
#91 - Meat Cutter 1287

#92 - Shipping Clerk	1303
#93 - Long Haul Truck Driver	1325
#94 - Truck Driver - Light	1351

PART R (CE 016 836)

#95 - Bus Driver	1371
#98 - General Loader	1397
#99 - Forklift Operator	1425
#100 - Material Handler	1439

NOTE

JOB DESCRIPTION NUMBERS. ACE investigated 100 jobs and developed 68 of them into Competency Based Job Descriptions. The above 68 are numbered according to the original listing. The gaps are in the numbering only. This is a complete list of the ACE Competency Based Job Descriptions.

ACE JOB ANALYSIS and INSTRUCTIONAL MANUAL

by

Michael Malone

Penny Pickels

A C K N O W L E D G M E N T S

We would like to thank the following people without whose help this undertaking would never have materialized:

The Adult Competency Education Project Staff:

Rocky Barrera
Joe Cooney
Linda Mazursky Kurtz
Michael Malone
Penny Pickels
Leandra Sidney

Joyce Bister, Becky Francis and Alice Gilmore for typing the manuscripts.

The following people deserve special thanks for making suggestions and mercilessly criticizing this work: Jan Becker, Joe Cooney, Linda Mazursky Kurtz and Kathryn Heley-Malone.

Our special appreciation is extended to Emily Glines for having the foresight to see a need for a new method of dealing with adult learners and for providing us with an opportunity to develop this system.

DISCLAIMERS

AN ARGUMENT FOR "IT"?

Throughout this Manual we have used the pronouns "he", "him", and "his" - not because we are sexist or overly traditional, but because:

A consistent use of "she" would imply that we are more concerned with female equality than education; interchanging "he" and "she" would prove confusing to the reader; and using "s/he" or "she/he" is absurd (there are no such beasts).

HOW TO MORE CLEARLY EXPRESS ONESELF

We have departed from "standard" English usage only when we believed that it was in the interest of clarity. We are sure that many teachers will notice our use of split infinitives within the text. This was not done arbitrarily. Rather, we felt that the selective use of this device enhanced the meaning of a particular passage. We hope that this explanation will allay your fears as to our qualifications in writing this manuscript.

"If, where the rules not far enough extend,
(Since rules were made but to promote their end)
Some lucky Licence answer to the full
Th' intent proposed, that Licence is a rule."

Alexander Pope
Essay on Criticism

FOREWORD

For many years, adult educators have been plagued by poor student attendance and the problem of maintaining student interest. The Adult Competency Education Project was founded on the premise that a major reason for these problems is a lack of relevance to students' lives. There are several ways to remedy this situation. The ACE Project feels that the solution is to make the course of study relevant to a student's job goal.

In order to meet the varied requirements of jobs, flexibility in analyzing job tasks was a prime requirement. This led ACE to the taxonomy of Generic Skills[1] developed by W. Kawula and A. De White Smith. From this taxonomy ACE abstracted those academic skills which were suitable for its method of job analysis. In addition, much work was done in tailoring the taxonomy to its needs through extensive revision and extensions of the original.

Once the framework had been constructed, the ACE staff had to determine the required tasks of a given job. This was accomplished through an on-site interview with an employee performing that job. These tasks were then evaluated in terms of the academic skills required for their execution. These skills were correlated with the revised taxonomy and were set up as Instructional Objectives which could then be written as competencies or as prerequisites to competencies.

[1] Kawula, W., and A. DeWhite Smith, Generic Skills, Training Research and development Station, Prince Albert, Saskatchewan, Canada, 1975.

Even though the idea of measurable objectives has been around for a long time, the meaning of the word "competencies" remains nebulous.

An ACE competency (see Exhibit E) is defined as containing:

a. the reason a particular skill is needed (the real-life task);

b. a statement of the academic skill (measurable Instructional objective: abstracted from the real-life task);

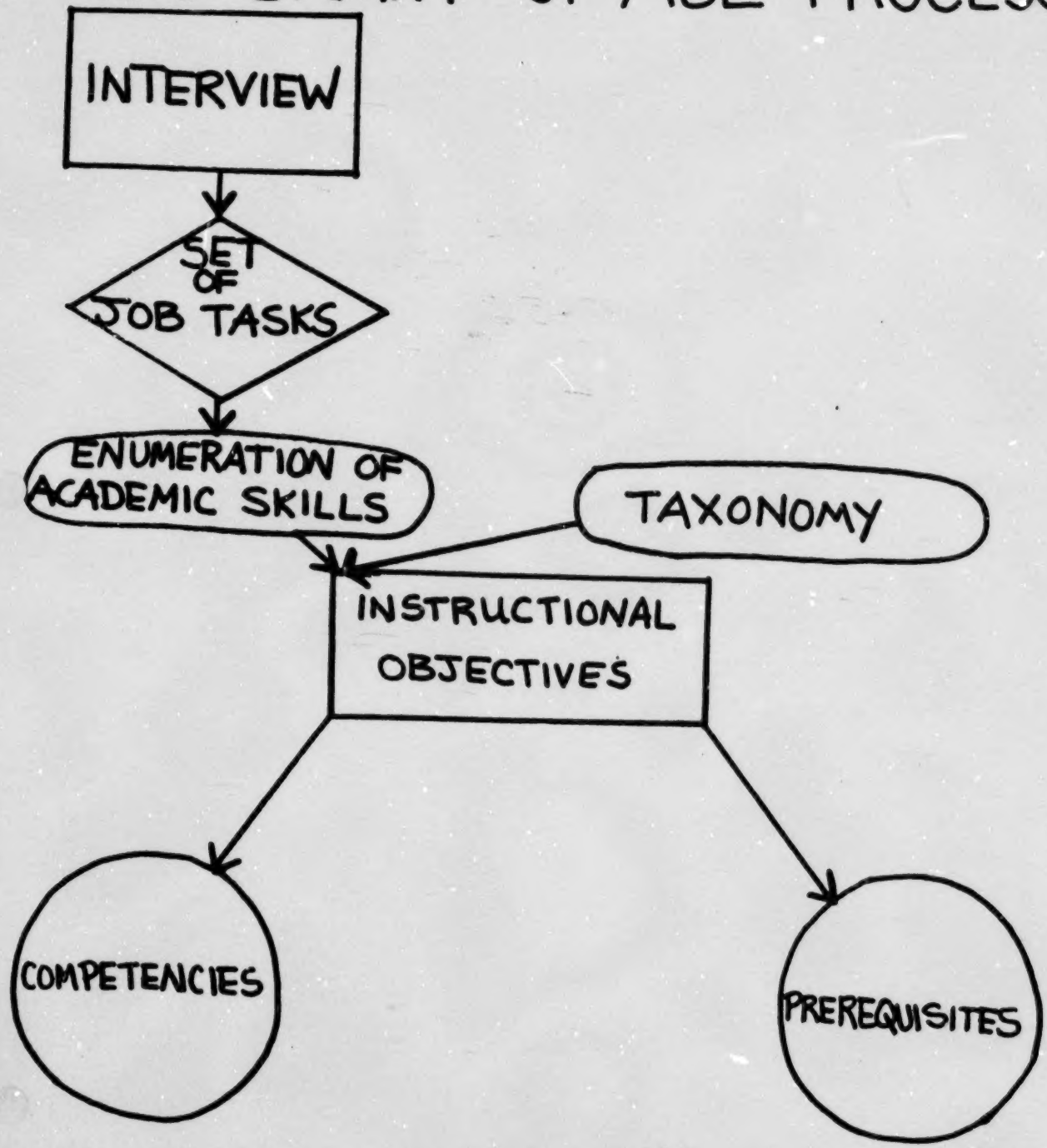
c. a task by which the student's ability to perform the academic skill can be demonstrated (classroom task);

The Adult Competency Education Project has used collections of these skills, clustered according to job requirements ("job descriptions", located in another section of this kit), as both counseling and instructional tools. Their usefulness as counseling tools is discussed in the ACE Counseling Manual, companion to the present work. Herein we are concerned primarily with the instructional aspects, although mention is made of counseling concerns.

****

We hope that this manual will serve as a source of ideas for secondary and Adult Basic Education teachers in the field of competency-based education.

FLOW CHART OF ACE PROCESS



GLOSSARY

ABE - Adult Basic Education

Academic Skills - Math and communications skills as opposed to manual skills such as typing, using tools, etc.

Career Lattice - A diagrammatic representation of possible upward and lateral movement within a particular career category.

Competency - A means of assessing a student's ability to perform a task, given a statement of the task and the necessity for that task.

D.O.T. - Dictionary of Occupational Titles. A set of reference books defining jobs, put out by the Department of Labor.

Employability Profile - A generalized version of a job description containing those skills required by a specified percentage of a group of jobs.

ESL - English as a Second Language.

Generic Skills - A set of academic skills arranged by grouping related skills into a hierarchy.

Instructional Objective - An academic skill containing criteria for judging mastery of it (the second part of an ACE competency).

Job Description - A set of discrete tasks embodying the academic skills required by a job.

Job-seeking Skills - Skills needed to apply for a job (i.e., filling out application forms, interview techniques, etc.

Manipulatives - Concrete, tactile objects used to teach abstract concepts (especially of mathematics).

Measurable Objective - An Instructional Objective.

Peer Tutoring - An active exchange of knowledge and information between students.

Prerequisite Skills - Academic skills, the mastery of which is necessary to perform another, higher level academic skill.

Task - Piece of work performed on a job.

Taxonomy - A highly-structured hierarchical listing of academic skills proceeding from the most concrete to the most abstract within each category of skills.

TABLE OF CONTENTS

FOREWORD 102

GLOSSARY 105

FINDING AN ESCAPE ROUTE FOR NONLEARNERS 110

CREATING THE JOB DESCRIPTION

SELECTING A JOB FOR ANALYSIS. 113

The Original ACE Method
A Second Method
A Third Method
A Variation On This Theme

THE INTERVIEWING PROCESS. 115

Locating The Site
The Interview Form
Arranging The Interview
Conducting The Interview

CONSTRUCTING THE JOB DESCRIPTION. 118

Task Analysis
Organization Of Instructional Objectives
Selecting I.D.'s To Be Competencied
Writing Competencies
Assembly

USING THE JOB DESCRIPTION

DIAGNOSTICS AND PROGRAM STRUCTURING 123

Intake Testing
Assessing Job Skills
Student Competency Profile
Determining Reading Level

Setting Contracts
Assignment Sheets
Record Keeping

INSTRUCTION 128
PRETESTING
INSTRUCTIONAL TOOLS
The ACE FILE
Individualizing Materials
A.O.K.
Workshops
Real-life Materials
Manipulatives
An Aside On Individualizing

EVALUATION OF STUDENT PROGRESS. 133
POSTTESTING
Pass
Doubtful
No Pass
REVIEWING
REASSESSING JOB SKILLS
EXIT TESTING

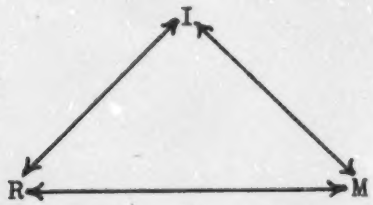
SUMMARY. 137

BIBLIOGRAPHY OF INSTRUCTIONAL MATERIALS. 138

APPENDICES. 142
Exhibit A - Methodology For Locating Key Entry Level Occupations For San Mateo County
Exhibit B - Blank Interview Form
Exhibit C-1 - Job-Related Graphics
Exhibit C-2 - Job-Related Prose
Exhibit D - Completed Interview Form
Exhibit E - Job Description Text

Exhibit F - Job Description Appendix
Exhibit G - Prerequisite Testing
Exhibit H - Pretest
Exhibit I-1 - Blank Student Competency Profile (Math)
Exhibit I-2 - Coded Student Competency Profile (Reading)
Exhibit J-1 - Blank Assignment Sheet (Reading)
Exhibit J-2 - Coded Assignment Sheet (Math)
Exhibit K - Time Card
Exhibit L-1 - Job Specific Math Exercise
Exhibit L-2 - Job Specific Reading Exercise
Exhibit M - A.O.K.
Exhibit N-1 - Language Experience Text
Exhibit N-2 - Language Experience Exercise
Exhibit O-1 - Completed Free Writing Form
Exhibit O-2 - Illustration of Timed Writing Test

The Adult Competency Education Project method is built upon three interdependent precepts: relevance, individualization, and motivation. Individualization and motivation have long been recognized as significant variables in learning theory. The Adult Competency Education Project has added relevance to produce a self-sustaining triangle of teaching methods.



Most "non-learners" have a very low self-image. To a large extent this is fostered by their lack of success in traditional schools. Desire to avoid noxious stimuli (failure, ridicule, ostracism, etc.) deterred them from re-entering the educational system. Most adult schools continue the goals of public high schools. That is, they presume a skill level sufficient to enable their students to acquire certification of a high school education which allows them to enter a specific job market or go on to higher education. These goals are incompatible with the adult whose skills are at a level that makes such certification seem unattainable. These students may see these goals as applicable to themselves on a long-term basis but their realization seems so remote that they soon cease to be effective motivators. No real connection is made between these educational goals and the adult's present life. Thus, any learning he does in an ABE class seems to have no further application. It is essential, to provide relevance to his immediate needs (i.e., getting a job, taking care of a family, etc.).

ACE designs a curriculum for each student based on that student's specific job goal. This provides the student with a goal which has value to him and can be achieved in a relatively short amount of time. This, in turn, motivates the student to attend classes which teach skills to which he had previously attached no importance. Relevance is achieved through relating the curricula directly to a specific job goal chosen by the

student and through breaking the job tasks into discrete academic skills and correlating them with a taxonomy of Instructional Objectives thus maximizing the student's chances for success.

The use of a job description selected by the student gives him a sense of controlling his education. This, in turn, motivates him to learn because he is learning what he needs to know on a job. This job-relevance reinforces his desire to learn. Tailoring each student's curriculum to his particular needs (individualizing) provides relevance to the student's life, increases his motivation, and offers the teacher the opportunity to work on a student's particular problem areas.

The word "individualization" has a tendency to intimidate and discourage instructors. All too often, the assumption is that the teacher must reserve an immense amount of time to work with each student one at a time. When we talk of individualizing, we refer to the process of setting up a separate program for each student using the taxonomy of Instructional Objectives as our base. In this way, students working on two different job descriptions can work on the same academic skills simultaneously. This lends itself admirably to group work, workshops, and peer tutoring. And yet, each student is working towards a personal goal, gaining skills and a sense of achievement, thus opening up new vistas and self-concepts. The discreteness of the instructional skills encourages success and, in this way, a "non-learner" can experience (often for the first time) what it means to succeed at learning! This new-found self-esteem is as important (if not more so) than the academic achievement itself, for it provides the student with a positive attitude toward learning and himself. It also frees a large amount of positive energy which he can now channel into other constructive pursuits -- like finding a way out of Mobile and finding the way to Memphis!

CREATING THE JOB DESCRIPTION

The Original ACE Method

There are many methods for selecting the job to be analyzed. The method ACE used was developed by Glenn Vaughn of the Santa Clara County Office of Education (Exhibit A). This is the system originally used to establish which jobs would be investigated by ACE. It is based on a job market analysis.

A Second Method

A second system for selecting job descriptions is the enhancement of the curriculum of existing vocational training programs, which may be divided into two groups: those which deal primarily with manual skills, and those which deal with both academic and manual skills. Both types of programs can use job descriptions to increase the relevancy of the academic segment of their curricula as well as to allow a large degree of individualization through the use of job clusters. When no academic curricula exists, they can be used to stimulate a student's desire to acquire these skills. By developing job descriptions for each job category in a cluster of jobs, the instructor has great latitude in providing structure for each student's needs and abilities.

Designing job descriptions around current vocational education programs allows teachers to validate their curriculum with respect to the actual needs of a job. This feedback from the "real" world to the classroom enables the instructor to constantly teach to the job. Periodic evaluation and consequent revision of the job description permits continued correlation of course content to job requirements. Included in the existing job descriptions developed by ACE are several designed for vocational training programs such as: Regional Occupational Program of San Mateo County, San Mateo County Vocational Services, and Opportunities Industrialization Center West.

A Third Method

Since the purpose of job descriptions is to motivate the student, the student's job preference is an important factor in determining the job to be analyzed. The student's job goal is subject to change and thus counseling takes on a significant role

*The reader will find it convenient to remove all of the appendices for easy reference.

in coordinating the instructional program with the student's desires. To insure continuity in the student's program, counseling should attempt to bring the student into constant contact with the selected job through various information gathering activities as specified in The ACE Counseling Manual. As the student learns more about his abilities, it becomes easier for him to decide upon a realistic job choice. Thus, there is nothing sacrosanct about a student's initial occupational goal.

A Variation On This Theme

The concept of a "job description" need not be limited to a specific occupational goal. Using competencies, an instrument can be constructed, dealing with skills necessary to function in our society, for students whose goal is a better command of their environment or for those who lack the skills necessary to make a suitable job choice. An extension of this could be an employability profile extracted from an analysis of the most common entry level jobs and consisting of those academic skills required for a majority of them.

Locating The Site

Job descriptions are developed from information obtained in an interview. The attempt to standardize job titles is complicated by the irregular use of such titles by employers. Thus, caution must be observed when attempting to locate job sites. The telephone directory offers only a very general sampling of various job categories and thus, should not be considered a primary source. Rather, one should consult the Dictionary of Occupational Titles for a job definition and then question the employers located in the telephone book as to job conformity to that definition.

In order to reduce the number of contacts necessary to isolate a particular job, there are several resources. Labor unions are often able to arrange interviews as well as provide information on entrance requirements and apprenticeship programs. A consortium of educational agencies will be publishing a book matching actual job titles in the San Francisco Bay Area with those standardized by the D.O.T.

An excellent resource is first-hand work experience by staff members or their colleagues in related programs in the areas to be analyzed.

These sources offer many advantages over a field interview: accessibility of interviewer (private employee frequently has stringent time constraints); availability of interviewee for future discussion of information obtained in the interview; thoroughness of presentation by interviewee because of indentification with interviewer's goals and problems; and facilitation of smooth flow of information because of informality of interview situation.

The Interview Form

In order to effectively transmit the job-related skills determined in the interview, an interview form was constructed using a taxonomy as its base. (See kit for revised ACE Taxonomy) However, the interview form included in the kit has not been updated to correspond to the revised taxonomy. In constructing the interview form consideration was given to the relative importance of a skill

to job functions, the frequency of that skill's use, and the context within which the skill was used (Exhibit B).

The interviewer must have a working knowledge of the aforementioned taxonomy (or a similarly constructed one) to facilitate the gathering of information.

Arranging The Interview

Once the interviewer is familiar with the tools and has chosen the job to be analyzed, he is ready to locate an interviewee. The interview appointment may be made through an employee's supervisor but should be conducted with the worker himself as the employer is prone to project his idealized image of the job. The worker, on the other hand, is more familiar with the actual day-to-day demands and requirements of his job.

When contacting the job site, the interviewer ascertains the names of both the worker and his supervisor, and briefly explains the purpose of the interview. It is essential that he stress the necessity of conducting the interview with the employee and the need for at least one uninterrupted hour of his time. He also explains that job related materials (manuals, charts, graphs, etc.) are essential to the instructional process, and requests that any such available materials be on hand at the time of the interview.

Since most employers are busy, it is advisable to send a cover letter reminding them of the previous conversation and the time and date of the impending interview. Reconfirmation by telephone the day before the interview is recommended. It is also a good idea to send the supervisor and employee a "thank you" note after the interview, mentioning the employee by name.

Conducting The Interview

Upon arriving at the interview site, the interviewer introduces himself to the supervisor and arranges for a quiet place to conduct the interview with the employee. It is important that the person conducting the interview examine the work site and

observe, if possible, the actual performance of the job. The interviewer briefly explains his purpose to the employee while allowing him to examine the interview form. He must be direct and specific in his questions; the employee cannot second guess what he wishes to know. If the interviewer receives a negative response, he must rephrase or concretize the question using the surroundings as stimuli. Once he has ascertained that a particular skill is used, he should press the employee to elaborate on the circumstances demanding his use of that skill on the job. The interviewer should author the job description. It is important that the interviewer annotate his explanations to insure that they can be understood if another person is to design the job description or if it is not to be written immediately following the interview. To avoid omitting sections of the taxonomy, strict sequential order in questioning should be maintained. The interviewer, however, may wish to note skills pertaining to preceding or upcoming questions which are elicited while the worker is addressing himself to another question.

The interviewer briefly examines available job-related materials with the worker and collects or arranges to borrow those which might prove useful. Exhibits C-1 and C-2 contain examples of such materials collected by ACE.

CONSTRUCTING THE JOB DESCRIPTION

Once all the materials have been collected and the interview has been completed, the next task is to organize them into a job description. The method of job description preparation used by ACE is as follows:

Task Analysis

The author of a job description must recreate the job tasks as a prelude to analyzing the skills required by the job. There are essentially two parts to this recreation: factual inputs and imagination.

The most important source of concrete job data is the interview form. Besides a general listing of academic skills, specific job tasks embodying these skills are delineated. In this way, the writer of the job description gains immediate insight into how the academic skills are used. (See exhibit D).

There exist several subordinate sources for picturing the job in terms of what skills are employed. Analyzing the D.O.T. job description, paying particular attention to the verbs used, enables the writer to imagine the worker on the job. This use of imagination is a most important element in analyzing a job as it is often necessary to fill in gaps on the interview form with respect to skills related to a particular job. Thus, new Instructional Objectives can be added to the taxonomy to accommodate new or previously unconsidered academic skills. Imagination prevents the analysis from suffering the rigidity of any printed matter.

An examination of the job-related materials gathered in the interview provides the writer with an exact knowledge of the type of reading and computational skills required by the employees. Careful attention to the details of how a skill would be employed in utilizing these materials will allow the writer to enumerate the discrete tasks necessary in coping with such materials.

In addition, whenever possible, the writer's own experience should be recalled in order to amplify and clarify the types of skills needed as well as their particular uses. Another excellent source of such data is the work experience of colleagues in adult

schools, their advice is invaluable and can be used to validate one's idea of the job and its related tasks.

The key to this whole process was the use of the author's creativity to first extrapolate the job tasks from the many factual inputs and then to dissect these larger tasks into discrete skills compatible with a taxonomy of Instructional Objectives. This use of imagination and the D.O.T. lends more validity (or transferability) to the job description than a single interview would incicate.

Organization of Instructional Objectives

Once the job tasks have been delineated, the writer of a job description then matches these tasks to the exact Instructional Objectives of the taxonomy. A thorough knowledge of these objectives and their limitations is essential. If a job task cannot be matched to a particular Instructional Objective, either new items must be created on the taxonomy or the author must find those items which most nearly coincide with the job skills. The Instructional Objectives can now be arranged numerically to facilitate the actual writing of the job description.

Selecting Instructional Objectives To Be Competencied

The criteria for selecting which Instructional Objectives to be competencied are variegated and subjective. Aesthetics plays a role in these choices.

Firstly, any skill frequently used is competencied. This is the primary consideration, both for reasons of veracity and to obtain a real "feel" for the job. The interview form used by ACE indicates the frequency of a skill's use on the job and thus, serves as a firm basis for the inclusion of corresponding academic skills.

Secondly, skills used less frequently and which can serve effectively as prerequisites to those competencied are so noted. The particular skill to which it is necessary is marked on the list of Instructional Objectives. If the prerequisite is necessary to more than one objective, a decision is made based on which skill is more clearly linked to that prerequisite (See Exhibit E).

At this point, another consideration appears, aesthetics. A full page of prerequisites reduces the job description's relevance to a student and appears choppy. These concerns led to an artitrary decision that no more than four prerequisites should appear in a row. Thus, when more than four prerequisite skills appear sequentially on the list, the next Instructional Objective is competencied, whether the associated task is frequently used or not.

Oftentimes, a skill is listed for which thought indicates that prerequisites not already enumerated are required. For example, recognizing fractions is inconceivable without the ability to recognize a whole number. Each Instructional Objective must be reviewed with the hierarchy of skills on the taxonomy in mind. This preserves the consistency of the job description and provides continuity to any curricula based on its content. Two other factors which should be taken into account are: the amount of time allotted to the student-instructor interview; and the palpability of the job description to the student. The first demands that a job description not be overly long in competencies. This is not to say that the author should arbitrarily suppress competencies. Rather, he should attempt to utilize his ingenuity to best represent the job by writing particularly specific and representative competencies. This idea supports and leads into the second idea mentioned above. The job description must provide the student with the flavor of the job and so, as much job-related material as possible should be included in the competencies (graphs, charts, manuals, maps, etc.).

Another important consideration is the transferability of academic skills between jobs. Certain skills are of paramount importance in attaining and maintaining a job and all job-seeking skills should be included in competency form if at all possible.

Writing Competencies

Once a list of desired competencies is developed, the writer organizes each one into competency form. The reason the skill is required by the job (gleaned from the interview form or secondary sources) is explained. The Instructional Objective from the taxonomy is next written down. Finally, a task is formulated from the author's imagination which crystallizes the Instructional Objective in the form of a task which can be performed in a classroom

setting.

Most of these tasks can be written so that the student can complete them using paper and pencil. The difficulty arises when a task requires some form of physical action or entails judgments of physical objects. Imagination and insight are the major tools used for constructing such competencies.

Assembly

After all of the competencies have been written, and the prerequisite skills are enumerated, the writer arranges them in a logical progression beginning with the lowest skills and proceeding to the highest level skills. This is primarily a clerical task.

Decisions as to pertinent data to be included on the title pages are then made. ACE job descriptions included the following information:

a. Occupational Title
b. D.O.T. Code
c. ACE Number (arbitrarily assigned for filing purposes)
d. Career Lattice
e. D.O.T.'s General Educational Development Level
f. Site of Interview (also includes sites where the same or similar jobs can be observed
g. Number of Annual Jobs in San Mateo County
h. Job Constraints (pre-employment tests, apprenticeship programs, other job entry requirements)
i. D.O.T. Job Description (including references to related jobs)

The final steps in assembling the job description are to insert graphics and to check appendices and prerequisites for veracity. When this is accomplished, the final product is ready for typing, printing, etc. (see Exhibits E and F)

USING THE JOB DESCRIPTION

DIAGNOSTICS AND PROGRAM STRUCTURING

INTAKE TESTING

When the student first came to ACE, the Reading Progress Scale (RPS) was administered. This provided a very general idea of the student's proficiency in reading. In addition, the ACE counselor gave the Reading/Everyday Activities in Life (R/EAL) Test to the student. This test is an excellent indicator of the student's ability to cope with everyday reading material. It also enabled the student to assess his own skills and needs, and provided a framework for counseling and instruction. At ACE this was carried on informally through discussions of the test results.

To gain more information for program structuring, the Adult Basic Learning Examination (ABLE) Test was given. It provided a grade level approximation of the student's reading and math skills. Because it is a standardized test, it allowed comparisons to be drawn between ACE students and adults enrolled in other academic programs. However, we (the writers) find two major flaws in this type of test. It does not lend itself to an accurate assessment of student's growth beyond the rudimentary aspects of developmental reading. It provides no information on reading skills other than ability to use context as a determinant of word meaning. In addition, we found that many times students scored substantially higher on this test than further investigation could substantiate. This fact appeared to be caused by students matching the answer with one or two words of the text. Thus, even though they couldn't read the passage, they answered the question correctly.

ASSESSING JOB SKILLS

Once a job goal has been decided upon, the counselor and instructor review the job description with the student. Each skill discussed is prefaced by the reason for its inclusion in the job description. The student is then given a task to perform which demonstrates his mastery of the competency. If he completes the task correctly, this is indicated on the job description. Inability to perform the task indicates the need for testing of the skills

prerequisite to that task in order to determine the student's level of competency within that skill's cluster. The testing should begin with the highest level skill prerequisite to the task in order to insure a systematic ascertaining of his mastery level as well as to avoid redundant testing of the same skills. The reader may examine Exhibit G for a clarification of the process of prerequisite testing.

If there is doubt about the student's competence at a task, additional exercises, or a pretest (Exhibit H) can be used to more clearly ascertain the student's mastery of the skill. This additional exploration would be utilized in situations where the student either solves the initial problem in an inordinately long amount of time or gives an incorrect response but demonstrates a knowledge of the processes inherent in the performance of the task.

STUDENT COMPETENCY PROFILE

In order to further reinforce the student's self-assessment, the "Student Competency Profile" was developed. Every Instructional Objective from the ACE taxonomy is symbolically represented on the Student Competency Profile as shown in Exhibits I-1 and 2. The instructor marks all Instructional Objectives required by the chosen job before consulting with the student. He develops a key so that he will be able to accommodate and distinguish between: required skills, additional skills desired by the student, skills the student possesses upon entering the program, and skills developed by the student while in the program.

In the student's presence, the instructor transfers all pre-instructional skills (gleaned from the competencies and prerequisites checked on the job description) to the Student Competency Profile. Thus, at a glance, the student can see which skills he possesses and those he needs to develop. In addition, the student may indicate supplementary skills he desires, and these should be indicated. This serves as a springboard for student-teacher conversation on the feasibility and desirability of the job goal. As the student masters various skills, they will be noted on the Student Competency Profile. This serves to raise the student's self-esteem as he sees visual proof of his success at learning. It also provides a

current overview of the student's skill inventory. Further attention in this manual is devoted to the Student Competency Profile in the section on record keeping.

DETERMINING READING LEVEL

If the student demonstrates difficulty with reading tasks on the job description, the instructor should spend time determining reading problems. ACE diagnosed three areas of need: phonics, word attack, and comprehension. Reading Evaluation Adult Diagnosis[2] (READ) was used to pinpoint specific phonic problems for beginning readers. To determine word attack needs for a student who reads many basic words but stumbles over longer, unfamiliar words, ACE used a list of nonsense words. By having the student pronounce such a list of words, the instructor can isolate problems in the areas of syllabication, accent, variant letter sounds, etc. In reading a passage, if the student decodes well, but demonstrates a lack of understand of what he reads, the instructor should use graded reading comprehension passages such as those found in the Specific Skills Series (see Bibliography) to determine the student's appropriate reading level.

SETTING CONTRACTS

The final, and perhaps most important step is a student-counselor-instructor interview in which an agreement is made as to the commitment the student is willing to make regarding the number of hours per week he will receive instruction and/or counseling and the times and dates he will attend.

When a beginning time and date for instruction has been set, the instructor prepares for the first session by reviewing the job description and student competency profile and deciding upon the appropriate starting point in each category of skills (i.e., reading, spelling, math, etc.). ACE used a set of assignment sheets (Exhibits J-1 and 2) which clustered skills into hierarchies of related Instructional Objectives.

[2]Calvin, Ruth J., and Jane H. Root, Reading Evaluation - Adult Diagnosis, Follett Publishing Company.

ASSIGNMENT SHEETS

The assignment sheets are coded, using the same criteria as the Student Competency Profile (competencies and prerequisites required, desired, and achieved). When the student completes a given Instructional Objective by meeting or surpassing the criterion of a posttest, it is noted and dated in the appropriate blank. Spaces are also provided for the date, nature, and completion of assignments as well as relevant comments.

Furthermore, the breaking down of the Student Competency Profile requirements into discrete packages of closely related skills provides the student with a short-term goal which he can see as attainable instead of a long-term goal which may overwhelm him with its sheer magnitude. Having a goal always stated provides the student the advantage of knowing why he is working on a particular assignment.

The assignment sheets also provide the student with a means of self-assessment in that he is always aware of the time and amount of effort expended on a given Instructional Objective. This can serve as a useful motivational tool and as a starting point for discussions on his attitudes and feelings about the program and his progress in it.

The concept of assignment sheets facilitates the short-term or permanent transfer of a student from one staff member to another with a minimum amount of disruption to the student's learning process and reconstruction of the student's program by the instructors involved. It is important that the former instructor provide suggestions for future assignments and, in addition, keep accurate and up-to-date records of past assignments to maximize the ease of transition. As an adjunct to this, the student, in situations where limited supervision is available, can examine the assignment sheets, note the next assignment, and begin work on his own.

Another advantage of these records is the ease with which an instructor can trace the student's progress as well as determine assignments already completed. This enables the instructor to

to provide exercises commensurate with the student's progress and present ability and to avoid redundancy and monotony in teaching materials.

RECORD KEEPING

Because the idea of a contract between the instructor and student is essential to this type of program, recording the amount of time spent by the student in instruction and counseling assumes paramount importance. The instructor and counselor should maintain records of student attendance, differentiating the time spent in math, reading, or counseling. In addition, student participation in such activities is elicited by means of a sign-in sheet and/or time cards (Exhibit K). The latter were found to be extremely popular due to their job relevance and innovative nature. The time card channels the attention of the student into his own attendance and thus serves as a stimulus for self-assessment of the student's attitudes and goals. At ACE the student was asked to tally his time at the end of each month. This served as another source of closure for the student.

INSTRUCTION

Pretesting

Pretests serve a two-fold purpose. They indicate the student's level of mastery within a cluster of skills (i.e., 2A.1-2A.8 as illustrated on Exhibit J-2). A correctly constructed pretest also permits the teacher to diagnose a student's specific areas of trouble by isolating the particular subskills involved in a given Instructional Objective. For example, a student's inability to satisfy the criterion of a pretest on multiplication of three-digit by five-digit numbers may be attributed to his confusion concerning multiplication process itself. Obviously, the solution in this case is not to return to one or two-digit multiplication, but rather to concentrate on problems involving numbers containing zeros.

Instructional Tools

Once a need has been determined, exercises should be assigned and explained. The ACE File used a variety of teaching methods and has attempted to integrate them into a complete system.

The ACE File

The largest source of exercises is the ACE file which is a compilation of worksheets collected from textbooks and materials created by the ACE staff correlated to Instructional Objectives. Their level ranges from pre-reading through the writing of business letters and prose; and from recognizing numbers through basic algebra and geometry. This file is arranged numerically by Instructional Objectives for easy access, thus allowing the instructor to readily select appropriate material for each student. This method also encourages a student to work independently by selecting exercises from the files based on his knowledge of his instructional program. See kit for an explanation of how to develop such a file.

Individualizing Materials

An integral part of the ACE system was individualization which required the use of exercises tailored to the student (Exhibits L-1 and 2). Tapes were used for non-readers who required auditory rather than visual stimuli. ACE used both staff-developed tapes and packaged software such as Clues to Reading Progress and Michigan Programmed Spelling. The use of tapes allowed the instructor to individualize students' lesson plans while freeing him to work with other students simultaneously. Although each student had an invidual lesson plan, ACE instructors worked with groups of students. In addition, the sequential nature of the individual programs allowed each student to work independently, enabling the instructor to work with several students simultaneously on an individual basis. As a complement to the tapes, ACE utilized several commercially available reading kits such as: Specific Skills Series, Reading, Spelling, Vocabulary, and Pronunciation, 88 Passages, and SRA Reading Kits.

A.O.K.

For intermediate readers (4th to 8th grade) a system developed by Dave Field of Capuchino High School, San Bruno, was implemented. A.O.K. is an acronym for the three major problem areas encountered in teaching these students: attending, organization, and knowledge. The concept behind this instrument is that these students recognize aurally words of a much higher complexity than is reflected by their reading level. The assumption is that the student, armed with certain decoding skills, will be able to provide various possible pronunciations of a given word and recognize the correct one. Word attack skills are categorized into four areas (see Exhibit M.) They allow the student to determine whether or not there is more than one way of breaking down a work and, if this is the case, teach him to change vowel sounds and accents as he changes

syllabication patterns. A.O.K. is particularly well suited to group instruction. Students can take turns providing possible means of syllabicating and thus pronouncing a written word. They can also learn spelling in a group using this method. A word is given orally, and each student is asked to give a phonetically correct (according to A.O.K. decoding rules) spelling of its pronunciation, syllable by syllable. Materials used for reading samples can come from vocational textbooks, current newspaper or magazine articles, or pamphlets on related vocational subjects. An excellent source for the latter is the Catalog of Free Teaching Materials.

Workshops

The ACE instructional staff initiated workshops designed to teach academic skills much as the ACE counselor created a series of job-seeking and skills identification workshops (see the ACE Counseling Manual). The counseling workshops necessitated the teaching of minimal reading skills (as of job applications, employment notices, and telephone directory). The instructional staff was on hand to help the counselor deal with these problems. The instructional staff should try to anticipate instructional requirements of the counseling workshops and work with those students who have demonstrated a need for help in these areas. The problems might be handled either through individual instruction or through instructional workshops.

The concept of instructional workshops arose in response to the large number of students requiring the same or similar skills. It also provided ways of working with large numbers of students simultaneously. An interesting outgrowth was the appearance, without prompting, of peer tutoring which increased the self-esteem and enthusiasm of the students. Some of the topics that could be covered are: making change, map reading, following directions, and working with the telephone directory.

Real-life Materials

Of an extremely useful nature are reading materials with which students closely identify. They fall into two major groups: items encountered by students in their prospective jobs and/or classes and "coping materials" (newspapers, recipes, checkbooks, motor vehicle manuals, etc.). The former group provides the instructional staff with insight into the student's other learning priorities and serves as a motivational factor. Student experiences can be dictated to the instructor who writes down or types what the student relates. This provides the student an opportunity to see his oral words as written symbols. The story can become the basis for various exercises (Exhibits N-1 and 2). The latter group helps to prepare the student to take advantage of opportunities existing in the real world, strengthens the work presented in counseling workshops, and offers the student an opportunity for self-assessment.

Manipulatives

Due to the difficulty of teaching mathematical concepts, every effort must be made to concretize abstract ideas. There are many commercially available manipulative packages. Moreover, with a little imagination a whole gamut of materials can be developed for individualization. Some possible sources for ideas might be: journals such as The Arithmetic Teacher; books on mathematical games and puzzles; or just plain inspiration. Besides manipulatives, everyday items can be used to demonstrate such things as the notions of conservation and comparison, and systems of weights and measures. Such items afford the student the opportunity to apply math skills he has developed. Moreover, sample tasks from the job description can be used to reinforce these abilities. These tasks enable a student to develop his concept of mathematics, which will serve as a base for understanding such abstractions as "word problems".

An Aside on Individualizing

The motivating force behind the ACE instructional method is the use of anything and everything possible to teach the student what he desires to know. Variety plays a key role in instruction; it is used to prevent monotony, maximize possibilities of success, maintain individualization when dealing with more than one student, and foster the notion that people are multi-faceted and that inputs from all the senses are important in making judgments about the real world.

The ACE method attempts to individualize because it allows the development of a more relevant curriculum and minimizes alienation. Because the program "belongs" to the student, he is discouraged from doing well merely to please his teacher. Rather, he is encouraged to succeed for his own personal satisfaction -- the satisfaction of achieving a self-established goal which has personal implications. Perhaps the most significant aspect of the ACE method is the promotion of an atmosphere in which people alienated from the learning process can succeed and thus view themselves from a different perspective and achieve a higher level of self-esteem.

EVALUATION OF STUDENT PROGRESS

Posttesting

Pass

When the instructor feels that the student has mastered an Instructional Objective, a posttest is administered. Postests have many items on them, each one of which is directly related to an Instructional Objective. In addition, the items are varied to include all aspects of the Instructional Objective and proceed from the least to the most difficult. A criteria for mastery of the skill is included so that immediate feedback is available.

If the student meets its criterion in a reasonable amount of time, this fact is marked and dated on the student's assignment sheet. This information is then transferred to the Student Competency Profile and discussed with the student. The instructor explains the job-related necessity for the next skill to be mastered (as indicated by the job description and indicated on the Student Competency Profile). After the student is clear about the need for the skill, a pretest is given to determine his present level of competence in that area.

Doubtful

An inordinate amount of time spent in achieving a passing score on a posttest may indicate that the student does not fully comprehend the processes involved in executing the task. If this is the case, perhaps a new, more concrete approach to learning is called for.

Students spending a lengthy amount of time in passing a posttest may fall into several other categories. Those who rapidly and accurately finished exercises leading to the posttest may be intimidated by a "test" situation or may have a greater need for success when judged on their performance. The teacher will usually recognize these types of students (from past performance

and pass them on to the next objective.

There is also a group of students whose performance on both the posttest and exercises on the tested Instructional Objective has been hesitant. Yet, these students have been very quick to complete exercises and tests on previous Instructional Objectives. This may be explained by the fact that work on previous skills built upon existing skills and afforded the student a sense of ease with the pertinent processes. His hesitancy in the area in question may be attributed to a feeling of not "owning" the process. Since the student is not performing at a job-competent level, he should be allowed an opportunity to demonstrate that he can, if the situation demands, operate rapidly and accurately. This can be tested by a timed exercise consisting of two or three problems. The final decision should be reached in a candid student/teacher conference.

The student who passes the posttest but has never demonstrated adequate speed on assigned tasks generally falls into one of two categories which may be differentiated by the use of a Precision Writing test such as that developed by the Castro Valley School District, Castro Valley, California. (Exhibits O-1 and 2.) A satisfactory free writing rate may indicate that he is still in the process of learning the skill but will require prolonged practice for mastery. To avoid monotony and a sense of failure, the instructor may elect, in conjunction with the student, to continue work on this objective while beginning instruction in a new skill.

An unsatisfactory free writing rate suggests that he is most likely a slow responder and may never achieve what an employer deems to be a job-competent level of speed. This indicates a review of the job description and its feasibility before proceeding to the more complex skills required by it.

No Pass

From an unsatisfactory score on the posttest, the instructor can infer that the student's concept of the processes involved is not fully developed. The primary concern here is to avoid discouragement and a relapse into the feeling of being a non-learner. Therefore, the instructor should attempt to isolate the specific problem which prevented passage of the posttest. New approaches in attacking these skills should be used and feedback elicited from the student. In addition to working with mechanics, emphasis should be placed on what the student can do, not what he can't do. To encourage the student's feeling of "owning" the processes, the student should rework problems he missed on the posttest. Methods of checking one's work should be stressed to enable the student to feel an inner, rather than an outer, locus of control and to realize that he is capable of accurately completing the task.

Reviewing

Both reading and mathematics Instructional Objective clusters have areas which are prerequisite to each other. For instance, the skills for working with whole numbers are repeated for decimals. Thus, when advancing from one cluster of skills to another, oftentimes the basic skills are reinforced. When certain skills are not often used, it is recommended that periodic reviews of those skills be instituted.

A standard finding in learning theory is the return of the learning curve to the baseline as a function of time between the last learning trial and a retest of the skill. The common explanation of this phenomenon is "forgetting". Another discovery of such experiments is the "relearning" effect. Even though the learning curve may be at the baseline at the time of

a retest, it will very quickly return to its former height when practice of the skill is reinstituted. Whereas both the pre-learning and pre-learning curves begin at the baseline, the former takes many trials to reach criterion and the latter only a few. For these reasons it is essential that a student practice or review a learned skill. Because the ACE students were usually not in a job situation which allowed them constant use of their newly acquired skills, the instructors found periodic review necessary for long-term retention.

Reassessing Job Skills

When the student has successfully completed the competencies required by his chosen job description, the counselor should again meet with the student and his instructor. The purpose of this session is to reassess the student's skills in terms of the job description, and reevaluate the student's self-concept with regard to learning. The student's ability to learn cannot be emphasized enough. In addition, the appropriateness of the student's job choice should be explored. At this time, a student's increased confidence might be used as a starting point for further career exploration. That is, he might now feel capable of securing and maintaining a job which he had heretofore thought unattainable.

Exit Testing

As a more standardized means of evaluating a student's progress, ACE again administered the ABLE upon a student's completion of his academic program. This also serves as a yardstick of the student's general academic level. This indicates the student's competence relative to other job choices and provides adult education programs, such as General Equivalency Diploma preparation centers, with useful information regarding his approximate grade level in reading and mathematics.

SUMMARY

The concept of a carefully defined "competency" is central to the Adult Competency Education Project's methodology. The three-part statement allows great flexibility in the use of competencies. The first part relates the need for the task and thus provides relevancy for the student. The second part is a general statement of the skill. This is useful to the teacher in integrating this skill into the curriculum as well as useful to the student in seeing the mastery of this skill as meaningful. In addition, because the skill is stated in general terms, it is transferable from one job to another, and a student mastering several of these skills is assembling an arsenal for dealing with future job and life needs. The third part of a competency details a classroom task allowing the student to demonstrate proficiency in the previously stated academic skill.

Although the actual content is no different than skills taught in most schools, the main appeal to the student lies in the job-related reason given for learning the skill. The beauty of the method being discussed is that each student's curriculum can be made relevant to his vocational goal. Rather than teaching to a large class and trying to interest the entire class at one time, the instructor can maintain each individual student's interest by enabling him to work on a meaningful goal. The student can learn what he needs to know at his own pace. The extensive use of such non-threatening situations (where individualizing allays the tensions of competition) will bring most of these students back into the mainstream of adult education.

BIBLIOGRAPHY OF MOST FREQUENTLY USED INSTRUCTIONAL MATERIALS

Reading - Writing

Avery, Bea, Hill's Garden Shop, California Leteracy, Inc., Alhambra, Calif., 1973.

_____, Cars, Cars, Cars, California Literacy Press, Alhambra, Calif., 1968.

_____, More Cars, Cars, California Literacy Press, Alhambra, Calif., 1968.

Boning, Richard A., Specific Skills Series: Detecting the Sequence, Drawing Conclusions, Following Directions, Getting the Facts, Getting the Main Idea, Locating the Answer, Using the Context, Working with Sounds, Barnell Loft, Ltd., 1976.

Brenner, Patricia Ann, Troubleshooter I, Books 1 thru 8, Houghton Mifflin Co., Boston, Mass., 1975.

Chapman - Copeman - Schulz - Schulz, The Mott Basic Language Skills Program, Comprehensive Series, Books 160, 300A, 300B, 301, 302, 303, 304, 600A, 600B, 601, 602, 603, 604, 900A, 900B, 1301, 1302, 1303, 1304, 1607, 1608, 1609, 1610, 1911, 1912, 1913, 1914, Teacher's Manuals 1300 - 1914, Allied Educational Council, Michigan, 1966, 1967, 1970, 1971, and 1974.

Hodkinson - Ornato, Wordly Wise, Educators Publishing Service, Inc., Copyright 1972.

Huls, Harry E., Sam, San Diego State University Press, Copyright 1974.

_____, The Mountain, San Diego State University Press, Copyright 1974.

_____, Jim's Bike, San Diego State University Press, Copyright 1974.

_____, The Fire, San Diego State University Press, Copyright 1974.

Lewis, Norman, Reading, Spelling, Vocabulary, Pronounciation, Books No. 1, 2, & 3, AMSCO School Publications, Inc., New York, 1967.

Lindamood, Charles H., M.A., and Patricia C. Lindamood, M.S., Auditory Discrimination in Depth, Teaching Resources, Inc., Boston, Mass., 1969.

Lockhart, William E., Michigan Prescriptive Program, Ann Arbor Publishers, 1975.

Pauk - Walter, Six-Way Paragraphs, Jamestown Publishers, Copyright 1974.

Rudd, Josephine, Word Attack Manual, Educators Publishing Service, Copyright 1962.

Sack, A., and J. Yourman, 88 Passages, College Skills Center, New York, 1975.

Sanford - Veaner, Clues to Reading Progress, Educational Progress Corp., 1972.

Mathematics

Avery, Bea, Money Spent, California Leteracy, Inc., Alhambra, Calif., 1973.

_____, Can Ann Do It?, California Literacy, Inc., Alhambra, Calif., 1973.

_____, House Help, California Leteracy, Inc., Alhambra, Calif., 1973.

_____, More Money, California Literacy, Inc., Alhambra, Calif., 1968.

Bright, George W., Mathematics Around Us, Scott, Foresman and Co., Copyright 1975.

Buckeye, Donald A., Experiments in Fractions, Midwest Publications Co., Inc., 1972.

Dressler, Isidore, Review Text in Preliminary Mathematics, AMSCO School Publications, Inc., New York, N.Y., 1962.

France, Norman, and Betty T. Clarke, Spectrum Mathematics, Blue Book, Red Book, Orange Book, Yellow Book, Purple Book, and Green Book, Laidlaw Bros., Palo Alto, Calif., 1973,

Jenkins - Mehean, Fraction Tiles, Activity Resource Co., Copyright 1972.

Kahn, Charles H., and J. Bradley Hanna, Money Makes Sense, Fearon Publishers, Inc., Belmont, Calif., 1972.

_____, Using Dollars and Sense, Fearon Publishers, Inc., Belmont, Calif., 1973.

Lucas, James R., and Evelyn Neufield, Number Blox: A Manipulative Mathematics Program, Creative Publications, Inc., Palo Alto, Calif., 1970.

McNerney, Charles, Mathematics Around Us, (test booklet and Teacher's Guide), Scott, Foresman and Co., Copyright 1975.

Mooney, Thomas J., Arithmetic That We Need, Frank E. Richards Publishing Co., Copyright 1966.

Shea, James T., Basic Essentials of Mathematics, Parts 1 & 2, Steck-Vaughn Co., Copyright 1975.

Wallace, Mary C., Figure it Out, Follett Publishing Co., Copyright 1971.

Wool, John D., Using Money Series, Counting My Money, Book 1, Frank E. Richards Publishing Co., Inc., Phoenix, New York, 1973 edition.

_____, Earning, Spending and Saving, Book 4, Frank E. Richards Publishing Co., Inc., Phoenix, New York, 1973 edition.

Young, Eleanor R., Basic Skills in Using Money, CEBCO Standard Publishing, New York, 1974.

Miscellaneous

Bassett - Goodman, Alphabetic Filing Procedures, South-Western Publishing Co.

Corcoran, Eileen L., Ed.D., and Ambrose L. Corcoran, Ed.D., Know the Signs - Be a Better Driver, Books 1 & 2, Frank E. Richards Publishing Co., Inc., Phoenix, New York, 1970.

Dare, Beatrice F., and Edward J. Wolfe, You and Your Pay, Follett Publishing Co., Chicago, Ill., 1967.

Fisher, Robert, Intensive Clerical and Civil Service Training, South-Western Publishing Co., Burlingame, Calif., 1968.

Fundamental Forms Skill Text, Special Service Supply, New York, 1976.

John, Hughes, People Working Today Series, Larry the Logger, Janus Book Publishers, Copyright 1975.

_____, People Working Today Series, Jester the Bellhop, Janus Book Publishers, Copyright 1975.

_____, People Working Today Series, Bob the Super Clerk, Janus Book Publishers, Copyright 1975.

_____, People Working Today Series, Janet the Hospital Helper, Janus Book Publishers, Copyright 1975.

Laubach Literacy, Be Informed Leaflets, Unit 9. Part 1. What are Taxes?

_____, Be Informed Leaflets, Unit 10. Part 1. What is a Bank?

_____, Be Informed Leaflets, Unit 13. Part 1. Time.

Match, Stephen D., Fill in the Blanks, Mafex Associates, Inc., Johnstown, Pa., 1974.

News for You, New Readers Press, edition B, March 23, 1977.

Occupational Education Series, Job Application Skills, Special Service Supply.

Pauk, Walter, Essential Skills, Books 1, 6, & 12, Jamestown Publishers, 1976.

Reading for Living Series, How to Use the Dictionary, New Readers Press, Syracuse, N.Y., 1971.

Reading for Living Series, How to Read Newspapers, New Readers Press, Syracuse, N.Y., 1971.

Reading for Living Series, How to Use the Telephone, New Readers Press, Syracuse, N.Y., 1971.

Reading for Living Series, How to Read Maps, New Readers Press, Syracuse, N.Y., 1971.

Miscellaneous

Reading for Living Series, How to Read Signs, New Readers Press, Syracuse, N.Y., 1971.

Reading for Living Series, Instructions on Safety, New Readers Press, Syracuse, N.Y., 1971.

Salisbury, Gordon, Catalog of Free Teaching Materials, Ribidoux Printing Co., Riverside, Calif., 1976.

EXHIBIT A

ACE PROJECT
609 Price Avenue
Redwood City, CA. 94063

Methodology for Locating Key Entry Level Occupations for San Mateo County*

I. Methodology

One of the goals of the Adult Competency Education Project was to develop competency based job descriptions for the one hundred most frequently available entry level occupations for San Mateo County. The identified jobs would be specified at the six digit DOT code level and would have the following characteristics:

1. Relatively high number of job openings.
2. Entry level academic ability range (GED 1 thru 4).
3. Promotion and wage advancement potential (career lattice).
4. Available or potential occupational skill training.
5. Job sites would be locally available for student visitation.

Step 1) The first step was to screen all the entry level occupations for a relatively high number of job openings.

Two data sources were used for this purpose as follows:

Data Source: 1972-75 and 1975-80, San Francisco, Oakland, SMSA Manpower Projections. EDD Employment Data and Research, U.S. Census Projections.

Data Provided: Current and projected annual employment for 470 census group occupations.

Data Source: Employment Security Automated Reporting Systems (ESARS Table 12). Note: this data is available nationally.

Data Provided: Cumulative Fiscal Year Job openings in San Mateo County EDD field offices by 3 and 6 digit DOT code.

* Developed by ACE with Glenn Vaughn, Labor Market Analyst, Santa Clara County Office of Education.

The development of these materials was supported by the USOE, DHEW. However, the materials do not necessarily reflect the position or policy of the USOE and no official USOE endorsement should be inferred.

The ESARS data represents on the average not more than 15% of the job openings in a geographic area. The manpower SMSA projection data was gathered door to door as part of the U.S. Census and is universal in scope. In order to obtain the ESARS level of detail from the universal projected U.S. Census Data, it was necessary to factor the census groups using the ESARS job opening activity as the factored weights (see attached chart).

Step 2) The second step was to screen the occupations for academic range. The occupations selected for the "on site" employer task analysis interview were screened to be jobs within immediate or near ability range of the target group. This was GED 1-4 (approximately grades 1-8), with emphasis on GED Level 2 and 3. Occupations were eliminated that did not fall within this range.

Step 3) Each selected occupation was to become the first level of a career lattice. The goal was to motivate students toward advanced learning and higher levels of employment after the student achieved competency in the basic academic skills necessary for the original entry level occupation selected. A three or four level career lattice was developed for each selected occupation. The worker trait groups of the Dictionary of Occupational Titles were used to find the related jobs for the career lattice.

Example: The Career Lattice for Salesperson General, DOT 289.458, is listed on the page 488 of DOT. A career lattice is shown below:

Level 1: Salesperson
Level 2: Sales Clerk
Level 3: Salesmen
Sales Manager

Note: The worker trait group is the last three digits of the DOT code. In this case the worker trait group 458 is titled Demonstration and Sales Work.

Step 4) It was considered important to have vocational training available or potentially available for students desiring advanced skill training. The U.S. Office of Education Handbook on USOE training Program Titles and Codes was

EXHIBIT A
(continued)

used for this final screening.

Step 5) The last step before interviewing employees was to identify job sites for interviews and future student visits. Job sites were selected from the local telephone directory for industries typically employing the occupation. An Industry-Occupation matrix that was developed as part of the U.S. Census was used to identify key industrial groups for the occupation being surveyed.

The listing of jobs is attached.

1.	2.	3.	4.	5.	6.	7.	
U.S. Census Group Job Title	Census Group 1972-75 Projected Annual Job Oakland - S.F. SMSA	San Mateo County Proportion of Oakland S.F.-SMSA Labor Force 15%	Census Group 1972-75 Projected Annual Job Openings San Mateo County	Related Titles in six Digits and DOT Codes (Table 12)	Number of San Mateo ESAR Openings	Weighted Distribution of ESARS Activity %	Prorated Annual Census Group Openings for San Mateo County at the Six Digit DOT Level
			(Col 2x3)				(Col 4x7)
Assemblers	599	x .15 =	90	Production Assembler DOT 706.887	(33)	(.37)	(33)
				Electronic Assembler DOT 726.884	(26)	(.29)	(26)
				Chassis Assembler DOT 729.884	(18)	(.20)	(18)
				Mechanical Assembler DOT 739.887	(13)	(.14)	(13)
						100%	
						Sub Total 90	

EXHIBIT A (continued)

EXHIBIT B

Page from Interview Form

		IMPORTANCE High-H Med-M Low-L	FREQUENCY OF SKILL USE Fre. 1/day+	Mod. 1/wk.	Sel. -1/wk.	THE ACTIVITY WHERE TASK IS R. (incl. language of job)
	GET EXAMPLES					
54	In your work do you read:	○ 54.	○	○	○	
	Alphabet					
55	Simple sight words	○ 55.	○	○	○	
56	Functional signs	○ 56.	○	○	○	
57	Forms such as work orders, job orders, vouchers claims, purchase orders	○ 57.	○	○	○	
58	Charts, excluding maps, lists and two column tables	○ 58.	○	○	○	

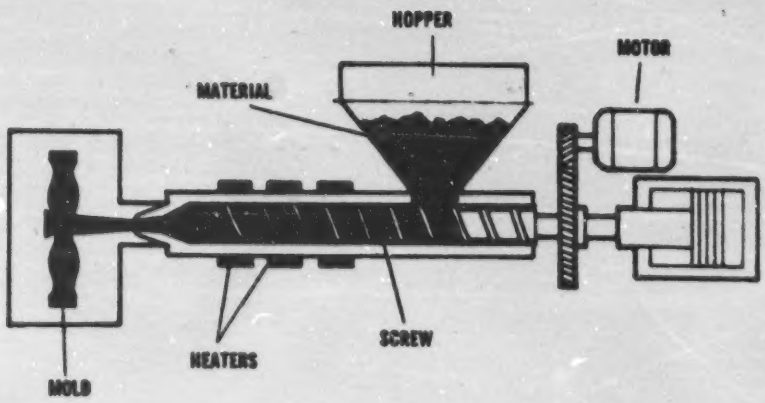
ORDER SIZE	TO FIT HEIGHT INCHES	WILL FIT AVERAGE CHEST INCHES	WILL FIT AVERAGE WAIST INCHES	TROUSER SEAM INCHES
1	UP to 31	30	24	11
2	32 34	31	28	12
3	35 37	32	30	13
4	38 40	33	31	14
5	41 43	34	32	17
6	44 46	35	33	19
7	47 49	36	33	20
8	49 50	36	33	21
9	51 52	37	34	22
10	53 54	38	34	24
11	55 56	38	35	25
12	57 58	39	35	26
14	59 61	41	36	28
16	62 64	43	37	29
18	65 66	44	38	30
20	67 68	46	39	31

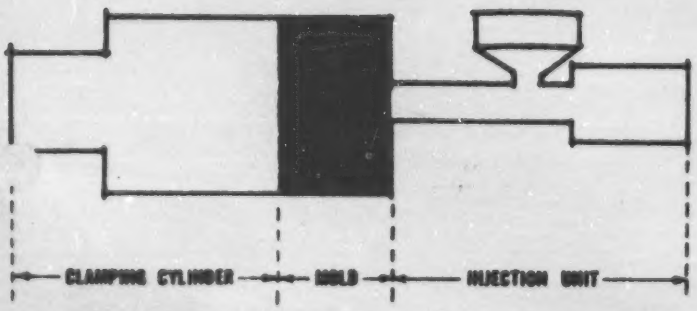
59	Specific technical vocabulary	○ 59.	○	○	○	
60	Part books	○ 60.	○	○	○	
61	Catalogs, reference books	○ 61.	○	○	○	
62	Do you read to analyze data	○ 62.	○	○	○	
63	Do you read to determine appropriateness	○ 63.	○	○	○	
64	Do you read for independent research	○ 64.	○	○	○	

EXHIBIT C-1

THERMOPLASTICS (Ranked by heat)

Material	Specific Gravity	Flow Temperature
CELLULOSICS		
Cellulose Acetate	1.30	335 - 490°F
Cellulose Acetate Butyrate	1.18	335 - 480
Cellulose Propionate	1.22	335 - 515
Ethyl Cellulose	1.14	350 - 500
OLEFINS		
Low density Polyethylene	.92	300 - 600
High density Polyethylene	.95	300 - 600
Polypropylene	.90	400 - 600
STYRENES		
Polystyrene, clear	1.05	350 - 700
Polystyrene, high impact	1.07	350 - 600
A B S	1.13	350 - 500
ACRYLICS		
Methyl Methacrylate	1.18	325 - 500
POLYAMIDE		
Nylon type 6/6	1.13	520 - 720
Nylon type 6	1.13	440 - 600
VINYL		
Polyvinyl Chloride, elastomeric	1.32	320 - 385
Polyvinyl Chloride, rigid	1.38	300 - 415





Job-Related Material EXHIBIT C-2

1. THIS CENTER HAS BEEN ADVISED BY THE FOOD AND DRUG ADMINISTRATION THAT CERTAIN FOREIGN PRODUCED CANNED PIMENTOS, PIMENTO SAUCE OR SWEET RED AND GREEN PEPPERS HAVE BEEN PLACED IN A CLASS II RECALL STATUS. THIS IS A PRIORITY SITUATION IN WHICH THE CONSEQUENCES MAY BE IMMEDIATE OR LONG-RANGE AND POSSIBLY OR POTENTIALLY LIFE THREATENING OR HAZARDOUS TO HEALTH. HOWEVER, IT IS STRESSED THAT TO DATE THERE HAVE BEEN NO REPORTED RELATED ILLNESSES TO THESE PRODUCTS. THESE RECALLS ARE PRECAUTIONARY INASMUCH AS CANNED PRODUCT ANALYSES REVEALED THAT PROCESSING METHODS WERE INADEQUATE TO PRECLUDE A POTENTIAL FOR BACTERIA OUTGROWTH.

2. OVER THIETY RECALLS HAVE BEEN ISSUED BY THE FDA WHICH INVOLVED IMPORTED PIMENTOS FROM DIFFERENT PRODUCERS AND PACKERS PRIMIRARILY FROM SPAIN. ALL ARE BRAND NAME PRODUCTS, NONE WERE PRODUCED OR PACKED IN THE UNITED STATES AND TROOP ISSUE ITEMS ARE NOT INVOLVED. EXCANGE ACTIVITIES, NON-APPROPRIATED CLUBS/MESSES AND COMMISSARY RETAIL STORES ARE POTENTIAL SOURCES OF THESE ITEMS. IMPORTED PRODUCTS ARE IDENTIFIED ON THE LABELS BY EITHER A MNUFACTRER'S NAME AND ADDRESS AND/OR A FOREIGN REGISTRY NUMBER.

3. IT IS RECOMMENDED THAT ALL IMPORTED PIMENTOS, PIMENTO SAUCE, OR RWEET RED AND GREEN PEPPERS IN STOCK BE WITHHELD FROM FURTHER SALE OR CONSUMPTION. PRODUCT ON-HAND SHOULD BE REPORTED TO THE IMMEDIATE SUPPLIER, DISTRIBUTOR, OR BROKER FOR SPECIFIC DETERMINTION OF RECALL STATUS AND SUBSEQUENT RFPACEMENT OR CREDIT AS APPLICABLE

57

BT

EXHIBIT D

149

INTERVIEW OF INJECTION MOLDER (con't.)

		IMPORTANCE High-H Med-M Low-L	FREQUENCY OF SKILL USE Fre. 1/day+	Mod. 1/wk.	Sel. -1/wk.	THE ACTIVITY WHERE TASK IS REQ (incl. language of job)
	GET EXAMPLES					"cyclac" = HR-52 "plexiglass" = B-17 (codes on these use letters
54	In your work do you read:	(H) 54.	✓			
	Alphabet					
55	Simple sight words	(H) 55.		✓		chemical labels — directions
56	Functional signs	(H) 56.	✓			warning signs (flammable
57	Forms such as work orders, job orders, vouchers claims, purchase orders	57.				
58	Charts, excluding maps, lists and two column tables	(H) 58.	✓			(see attached) heating temps., specific gravity

could be very hazardous to make mistake

ORDER SIZE	TO FIT HEIGHT INCHES	WILL FIT AVERAGE CHEST INCHES	WILL FIT AVERAGE WAIST INCHES	TROUSER SEAM INCHES
1	UP to 31	30	30	11
2	32 34	31	30	12
3	35 37	32	31	13
4	38 40	33	31	15
5	41 43	34	32	17
6	44 46	35	33	19
7	47 49	35	33	20
8	49 50	36	33	21
9	51 52	37	34	22
10	53 54	38	34	24
11	55 56	38	35	25
12	57 58	39	35	26
14	59 61	41	36	28
16	62 64	43	37	29
18	65 66	44	38	30
20	67 68	46	39	31

						hopper — container, feeder polystyrene — white, thermo plastic
59	Specific technical vocabulary	(H) 59.	✓			cycle — complete operation sprue — plastic "feed" hole
60	Part books	60.				(see booklet for more terms
61	Catalogs, reference books	61.				
62	Do you read to analyze data	62.				
63	Do you read to determine appropriateness	63.				
64	Do you read for independent research	64.				

8

Page from Job Description EXHIBIT E

3.1 Prerequisite to 16B.3 — Describe the uses of charts and tables and define them as a visual way to give information in a compact and organized form.

16B.2 Prerequisite to 16B.3 — State the type of information recorded on given charts and tables.

16B.3 COMPETENCY

a. The INJECTION MOLDER must be able to to obtain instructions from the set-up or lead person, such as cycle and injection times, temperatures...which are given on a set-up sheet.

b. To accomplish this task, the student must be able to read charts and tables.

c. To demonstrate the ability to perform this task, the student will read the following and determine that high impact Polystyrene has a specific gravity of 1.07 and a flow temperature of between 350-600°F.

THERMOPLASTICS (Melted by heat)

Material	Specific Gravity	Flow Temperature
CELLULOSICS		
Cellulose Acetate	1.30	335 - 490°F
Cellulose Acetate Butyrate	1.18	335 - 480
Cellulose Propionate	1.22	335 - 515
Ethyl Cellulose	1.14	350 - 500
OLEFINS		
Low density Polyethylene	.92	300 - 600
High density Polyethylene	.95	300 - 600
Polypropylene	.90	400 - 600
STYRENES		
Polystyrene, clear	1.05	350 - 700
Polystyrene, high impact	1.07	350 - 600
A B S	1.13	350 - 500
ACRYLICS		
Methyl Methacrylate	1.18	325 - 500
POLYAMIDE		
Nylon type 6/6	1.13	520 - 720
Nylon type 6	1.13	440 - 600
VINYL		
Polyvinyl Chloride, elastomeric	1.32	320 - 385
Polyvinyl Chloride, rigid	1.38	300 - 415

APPENDIX 61-B
(INJECTION MOLDER)

EHIBIT F 151
Page from Job Description

EMPLOYMENT APPLICATION

1. NAME (Last) (First) (Middle)

2. ADDRESS (Number, Street, City, Zip Code) | 3. TELEPHONES Home ____ Business ____

Length of Time at Current Address | Time at Previous Address

QUESTIONS 4 THROUGH 10 MUST BE ANSWERED *YES* OR *NO*

	YES	NO		YES	NO
4. Do you have a valid California Drivers License?			6. May we contact your present employer as to your qualifications, character and ability?		
5. Do you claim Veteran's Preference? If *Yes*, complete the following and submit copy of DD214 with application. (Veteran's Preference is applicable to entry level positions, only.) SERVICE DATES From ____ To ____ NOTE: To receive credit you must have served at least 30 days in the United States Armed Forces in time of war, or national emergency declared by the President of the United States of America, and have been discharged or released under conditions other than dishonorable.			7. Have you ever been dismissed from employment or resigned to avoid dismissal for misconduct or unsatisfactory service? (If *Yes*, give details in Question 11)		
			8. Have you ever received Workmen's Compensation? (If *Yes*, describe in Question 11)		
			9. Have you any disease, nervous disorder, physical disability or infirmity? (If *Yes*, describe in Question 11)		
			10. Have you been hospitalized for any reason in the past five years? (If *Yes*, describe in Question 11)		

11 Explanations to questions 7 through 10 (Use additional sheets of paper, if necessary.)

12 **EDUCATIONAL RECORD**

Circle Highest Grade Completed 8 9 10 11 12 | Name and Location of Last Elementary or High School | Graduated? Yes ☐ No ☐

Name and Location of College or University | Major | Credits or Degree

List any related business, trade, special training (give location and dates); estimated typing and shorthand speeds; San Mateo County typing and/or shorthand certificates (give certificate number and date); location of college placement file; and other related information as applicable.

13. **EMPLOYMENT INFORMATION** (Begin with your present employment and work back. Account for all time during the past ten years, including periods of unemployment. In addition, please describe any other related work experience, including volunteer work. Use additional sheets if more space is required.)

Present or Last Position

Employer ____ From ____ mo. year
Address ____ To ____ mo. year
Supervisor's Name & Title ____ Phone ____ Total ____ years months
Your Title ____ Full Time ☐ Part Time ☐
Duties ____ Last Salary ____
Reason for leaving ____

Employer ____ From ____ mo. year
Address ____ To ____ mo. year
Supervisor's Name & Title ____ Phone ____ Total ____ years months
Your Title ____ Full Time ☐ Part Time ☐
Duties ____ Last Salary ____

14. **PERSONAL REFERENCES - GIVE THREE** (Do not include previous employers or relatives.)

NAME	ADDRESS	PHONE NUMBER

EXHIBIT G

ILLUSTRATION OF ASSESSMENT OF COMPETENCY 2A.5 AND ITS PREREQUISITES

Page from Job Description

V 1C.3 **Prerequisite to 2A.5** Perform division of two simple whole numbers (no remainder) given instructions such as:

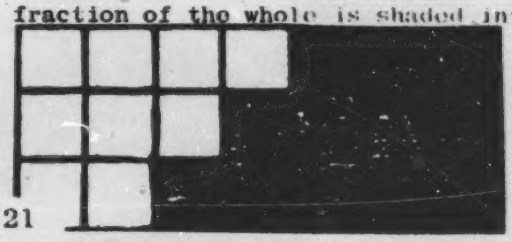
2 divided by 6 is ___.	$6 - 2 =$ ___.
2 into 6 goes ___ times.	$2\overline{)6} =$ ___.
The quotient of 6 divided by 2 is ___.	$\frac{6}{2} =$ ___.

2A.1 The groundskeeper must be able to estimate the number of plants in a flat.

To accomplish this task, the student must be able to recognize fractional parts of a whole.

To demonstrate the ability to perform this task, the student will examine the diagrams below and determine what fraction of the whole is shaded in:

a. 3/8



b. 12/21

IV 2A.2 **Prerequisite to 2A.5** Reduce a fraction to its simplest form (lowest terms).

III 2A.3 **Prerequisite to 2A.5** Change improper fractions to mixed numbers and mixed numbers to improper fractions.

II 2A.4 **Prerequisite to 2A.5** Write equivalent fractions for a given fraction given a new numerator and denominator.

I 2A.5 The groundskeeper must be able to use the proper sized tools to make minor mechanical repairs.

If the student is unable to perform this task, test the prerequisites to this competency (2A.5), beginning with 2A.4 and working backwards, until you find a task the student can accomplish. Roman numerals indicate the order of testing for this skill cluster.

To accomplish this task, the student must be able to arrange a set of fractions according to their sizes.

START HERE

To demonstrate the ability to perform this task, the student will place the following fractions in ascending order:

1/2; 5/8; 3/16; 3/4; 7/32.

EXHIBIT H

2A.5 Ordering Fractions

PRETEST/POSTTEST

Arrange the following groups of fractions in ascending order:

(1)	$\frac{3}{4}$	$\frac{1}{4}$	$\frac{2}{4}$	—	—	—	
(2)	$\frac{1}{2}$	$\frac{1}{6}$	$\frac{4}{4}$	—	—	—	
(3)	$\frac{2}{2}$	$\frac{3}{6}$	$\frac{0}{4}$	—	—	—	
(4)	$\frac{1}{3}$	$\frac{1}{6}$	$\frac{1}{2}$	—	—	—	
(5)	$\frac{1}{4}$	$\frac{4}{6}$	$\frac{1}{2}$	—	—	—	
(6)	$\frac{5}{6}$	$\frac{2}{3}$	$\frac{3}{4}$	—	—	—	
(7)	$\frac{1}{3}$	$\frac{6}{6}$	$\frac{0}{4}$	—	—	—	
(8)	$\frac{3}{3}$	$\frac{0}{5}$	$\frac{4}{5}$	—	—	—	
(9)	$\frac{1}{5}$	$\frac{2}{3}$	$\frac{1}{2}$	—	—	—	
(10)	$\frac{2}{3}$	$\frac{2}{5}$	$\frac{2}{2}$	—	—	—	
(11)	$\frac{3}{5}$	$\frac{2}{2}$	$\frac{1}{3}$	—	—	—	

(12)	$1\frac{1}{2}$	$\frac{3}{4}$	$\frac{2}{3}$	$1\frac{1}{3}$	—	—	—	—
(13)	$1\frac{1}{10}$	$1\frac{1}{11}$	$\frac{7}{8}$	$\frac{9}{10}$	—	—	—	—

63

Score _____ Criterion 11

Blank Student Competency Profile (Math)

EXHIBIT I-1

INSTRUCTIONAL OBJECTIVES

WHOLE NUMBERS		
1A.	Read, Write and Count	[1] [2] [3] [4] [5] [6]
1B.	Add and Subtract	[1] [2] [3] [4] [5] [6]
1C.	Multiply and Divide	[1] [2] [3] [4] [5] [6]
1D.	Combination of Function Problems	[1]
1E.	Round Off	[1]
FRACTIONS		
2A.	Read and Write	[1a] [1b] [2] [3] [4] [5] [6] [7] [8]
2B.	Add and Subtract	[1] [2] [3] [4] [5] [6] [7] [8] [9] [10]
2C.	Multiply and Divide	[1] [2] [3] [4] [5] [6] [7]
2D.	Combination of Function Problems	[1]
DECIMALS		
3A.	Read, Write and Count	[1] [2] [3]
3B.	Add and Subtract	[1] [2] [3] [4]
3C.	Multiply and Divide	[1] [2] [3] [4] [5] [6] [7]
3D.	Round Off	[1]
3E.	Dollars and Cents	[1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12]
3F.	Combination and Function Problems	[1] [2]
PERCENT		
4A.	Read and Write	[1] [2]
4B.	Percentage Calculation	[1] [2] [3]
4C.	Word Problems	[1] [2] [3] [4] [5]
MIXED OPERATIONS		
5A.	Equivalents	[1] [2] [3] [4] [5]
5B.	Problems with Mixed Functions with Varied Types of Numbers	[1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11]
5C.	Ratio	[1] [2] [3]
5D.	Proportion	[1] [2] [3] [4]
5E.	Distance, Time, Rate	[1]
MEASURE, ESTIMATE, CALCULATE		
6A.	Areas	[1] [2] [3] [4a] [4] [5] [6] [7] [8] [9]
6B.	Perimeters	[1] [2] [3] [4] [5] [6] [7]
6C.	Volumes	[1] [2] [3] [4] [5] [6]
6D.	Capacity	[1] [2] [3]
6E.	Weight	[1] [2] [3]
6F.	Distance	[1] [2] [3]
6G.	Time	[1] [2] [3] [4] [5] [6] [7]
6H.	Costs	[1] [2] [3] [4] [5]
6I.	Conversion, English Units	[1] [2] [3] [4]
ALGEBRA		
7A.	Symbols and Terminology	[1] [2] [3]
7B.	Directed Numbers	[1] [2] [3] [4] [5] [6] [7] [8] [9] [10]
7C.	Formula Solution	[1] [2]
7D.	One-Variable Open Sentences	[1] [2] [3]
7E.	Progressions and Series	[1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15] [16]
7F.	Exponents and Polynominals	[1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11]
7G.	Special Products and Factoring	[1] [2] [3] [4] [5] [6] [7] [8] [9]
7H.	Radicals, Rational and Irrational Numbers and Quadratic Equation	[1] [2] [3] [4] [5] [6] [7]
7I.	Graphs	[1] [2] [3] [4] [5] [6]
7J.	Sentences in Two Variables	[1] [2] [3] [4] [5] [6] [7]
7K.	Matrices	[1] [2] [3]
7L.	Permutations and Combinations	[1] [2] [3] [4] [5] [6] [7] [8] [9]
7M.	Probabilities	[1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14]
7N.	Number Bases	[1] [2] [3] [4] [5] [6] [7] [8] [9]
7O.	Set Theory	[1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11]
7P.	Group Theory	[1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15] [16] [17]

MATHEMATICS

EXHIBIT I-1
(continued)

MEASURE	
8A. Read Graduated Scales	[1] [2] [3] [4] [5] [6] [7]
METRIC MEASURE	
9A.. Distance	[1] [2] [3] [4]
9B. Distance Conversion	[1] [2]
9C. Weight	[1] [2] [3] [4]
9D. Weight Conversion	[1] [2]
9E. Capacity	[1] [2] [3] [4]
9F Capacity Conversion	[1] [2]
9G. Temperature Conversion	[1] [2] [3] [4] [5]
DRAWINGS AND GRAPHS	
10A. Read Graphs	[1]
10B. Draw Graphs	[1]
GEOMETRIC FIGURES	
11A. Forms and Figures	[1] [2] [3] [4] [5] [6] [7] [8] [9]
11B. Angles	[1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14]
11C. Draw/Sketch	[1] [2] [3] [4]
DRAWINGS AND GRAPHS	
12A. Read Scale Drawings	[1] [2] [3] [4]
12B. Draw to Scale	[1] [2] [3]
12C. Measure From Scale Drawings	[1]
12D. Read Assembly Drawings	[1]
12E. Read Schematic Drawings	[1] [2]
12F. Shop Drawings	[1] [2]

Student Competency Profile (Reading) EXHIBIT I-2
Coded for Injection Molder — J.D.#61

INSTRUCTIONAL OBJECTIVES

[X] Required by job
[X] Student choice
[ ] Pre-instructional skill
[■] Acquired thru instruction

READING I

13A. Letters of the Alphabet — [■] [2]

BASIC WORD CUES

14A. Beginning Reading — [1] [2] [3] [4] [5] [6] [7] [8] [9] [10]
14B. Pre-A.O.K. — [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12]
14C. A.O.K. (Basic Syllabication) — [1] [2] [3] [4]
14D. Advanced (Developmental) Reading — [1] [2] [3] [4] [5]

BASIC SIGHT WORDS

15A. General — [■] [■] [■] [1]
15B. Functional Signs — [1] [2] [3] [4]
15C. Meaning from Context

READING II

16A. Form — [■] [X] [X] [X]
16B. Charts and Tables — [X] [X] [X] [1]
16C. Notes, Letters and Memos — [1] [2] [3] [4] [5] [6]
16D. Manuals, Reference Books — [✓] [2] [3]
16E. The Newspaper — [1] [2] [3] [4] [5] [6] [7]
16F. The Dictionary — [✓] [2] [3] [4] [5] [6] [7] [8] [9]
16G. Maps — [1] [2] [3]
16H. Contracts

17A. Literal Comprehension — [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13]

READING III

18A. Evaluative Comprehension — [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12]
18B. Interpretive Comprehension — [1] [2] [3] [4] [5] [6] [7] [8]

LISTEN

19A. Literal Comprehension — [1] [2] [3] [4] [5] [X] [7] [X] [9] [10] [11] [X] [13] [14] [15]
19B. Interpretive Comprehension — [1] [2] [3] [4] [5] [6] [7] [8] [9]
19C. Evaluative Comprehension — [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13]

BASIC WRITING SKILLS

20A. Letters of the Alpahbet — [1]
20B. Copying Texts and Drafts — [1] [2] [3] [4] [5] [6]

NAMES, ADDRESSES, DATES and TIME

21A. General — [1] [2] [X] [X] [X] [6] [7] [8]

FORMS AND JOB APPLICATIONS

22A. Phrases on Forms — [X]
22B. Sentences on Forms — [X] [X] [3] [4] [5] [6] [7] [8]
22C. Grammar — [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15] [16] [17] [18] [19] [20] [21] [22] [23] [24] [25] [26] [27] [28] [29] [30] [31] [32] [33] [34] [35] [36] [37] [38] [39] [40] [41] [42]
22D. Short Notes — [X]
22E. Take Notes — [1] [2] [3] [4]
22F. Paragraphs — [1] [2] [3] [4] [5] [6] [7] [8]
22G. Internal Memos — [1] [2]
22H. Purchase Orders, etc. — [1]

LETTERS

23A. Form Letters — [1]
23B. Business Letters — [1] [2] [3] [4] [5]

WRITING STYLE

(objectives not yet established)

READING

EXHIBIT I-2
(continued)

SPEAKING ABILITY	
25A. Information or Directives	[1] [2] [3] [4] [5] [6]
25B. Elementary Conversation	[1] [2] [3]
25C. Use Telephone	[1] [2] [3] [4] [5] [6]
25D. Give Directions	[1] [2] [3] [4] [5]
ORGANIZE INFORMATION	
26A. Sort Data	[1]
26B. Sort Objects	[1]
26C. Rank	[1]
26D. Develop Classification	[1]
TOOLS, EQUIPMENT AND MATERIALS	
27A. Use of Tools and Instruments	[1]
27B. Selection of Tools, Equipment and Materials	[1] [2] [3]
27C. Selection of Procedures and Methods	[1] [2] [3]
27D. Analysis	[1] [2]

READING

No	Item	Score	Criterion	Date Completed
14 D.1	Meanings of Prefixes, Suffixes, Roots		50/[illegible]	
14 D.2	Variant Spellings for Sounds		45/[illegible]	
14 D.3	Accents		9/[illegible]	
14 D.4	Contractions, Abbreviations		23/25	
14 D.5	Synonyms, Antonyms, Homonyms		H 18/20	
			S-A-34/40	

EXHIBIT J-1

OBJECTIVE: 14 D-Advanced Read

NAME: _____

CBJD: _____

158

Assignment Sheet (Reading)

DATE	ASSIGNMENT		COMMENTS	DATE	ASSIGNMENT		COMMENTS

✓ 2A.2	REDUCE TO LOWEST TERMS			
✓ 2A.3	← 3/4 = 23/4 ; 23/4 = 5 3/4			
✓ 2A.4	1/4 = ?/8, 3/16 ; 3/4 = 9/12, 12/16			
✓ 2A.5	ARRANGE IN ORDER: 3/4, 1 1/2, 5/16, 2/4, 3/8			
2A.6	35 = 3/5 OF WHO, WHOLE			
2A.7	FIND COMMON DENOMINATOR			
2A.8	WRITE EQUIVALENT FRACTIONS USING C.D.			

OBJECTIVE: 2A READ & WRITE FRACTIONS

NAME: _____

CBJD: EXHIBIT J-2

Assignment Sheet (Math)

DATE	ASSIGNMENT		COMMENTS	DATE	ASSIGNMENT		COMMENTS
6/1	Pre-test 2A.1	✓	very close				
6/3	spec. pg. 3 - RED	✓					
6/3	test 2A.1	✓	passed				
6/5	show how to convert (2A.2)	✓					
6/8	M.A.U. pg. 28	✓	missed frac. to mixed				
6/10	add. instruc. frac to mixed	✓					
6/10	M.A.U. pg. 29	✓	better				
6/12	M.A.U. pg. 30						
	M.A.U pg. 31						
	70						71

160 # Student Time Card

EXHIBIT K

Name: _____
(last) (first)

Month: _____

	IN	OUT	HRS	MINS
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
Monthly total				

What I learned this month at ACE:
(competencies completed)

FRONT

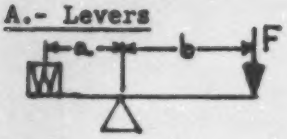
BACK

Job-Related Exercise (Math) EXHIBIT L-1

7C.1 Formulae for simple machines

Correct use of simple machines involves the use of various formulae. For each section below, use the stated formula to solve the given word problems.

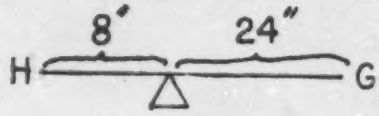
A.- Levers



$F \times a = W \times b$

F = force applied;
W = weight or resistance;
a = distance from fulcrum to the point where force is applied;
b = distance from fulcrum to point where weight is applied.

1. In the diagram below, what force is applied at point H if a force of 80 pounds is applied at point G?



2. Given a board 3' in length, a weight of 300 pounds, and a man who can exert 100 pounds of force, locate the point where the fulcrum of a lever should be placed on the diagram below to enable the man to lift the weight.

B. - Pulleys

P = force applied on the free strand;
W = weight lifted;
n = number of moving strands.

$W = P \times n$, or

$P = \frac{W}{n}$.

3. How many moving strands are needed to move an 800-pound weight with a 50-pound force?

4. Given a pulley with 6 moving strands and a weight of 372 pounds, what force is required to lift the weight?

5. What weight can be lifted by a pulley having 4 movable strands and with a force of 120 pounds?

EXHIBIT L-2

(for a beginning reader working on a bus driver job description)

14A.6 Short Vowels

Job-Related Exercise (Reading)

Fill in the blanks:

1. I want to drive a b_s.
2. It carries more people than a taxi c_b.
3. A c_b driver wears a h_t.
4. People m_st s_t down when the b_s is moving.
5. If the b_s h_ts a deep r_t in the road, it may get a fl_t tire.
6. That's why you carry a spare tire and a j_ck.
7. The engine needs more water on a h_t day.
8. The b_s is high up, so people must walk _p st_ps.
9. A b_s r_ns on a_s.

Description of A.O.K.

EXHIBIT M

The four objectives for A.O.K. as they appear in the ACE taxonomy are:

14C.1 Given a multi-syllable word in which two consonants follow the first vowel, the student will divide that word between the two consonants. (Students will recognize that consonant blends and digraphs are treated as a single consonant.)

14C.2 Given a multi-syllable word in which a single consonant follows the first vowel sound, the student will divide that word in two possible places V/CV VC/V and give three possible pronunciations. (Vowel as long, short, or schwa)

14C.3 Given a word in which the letters -le follow a consonant, the student will divide the word making the CLE letters a single syllable.

14C.4 Given a word in which there are prefixes or suffixes, the student will syllabicate that word showing that prefixes and suffixes form their own syllables.

The above objectives address themselves primarily to the O. (organization) part of A.O.K. The student is ordinarily able to immediately correct his attending errors when they are pointed out. The instructor is instrumental in aiding the student to correct knowledge errors. The most valuable lessons in decoding occur in the student's correction of his organizational errors by applying rules he has learned.

Syllabication of words in A.O.K. does not necessarily correspond to their dictionary breakdown. Rules taught for dividing words enable the student to generate a set of possible pronunciations of the word on the premise that he will recognize one of these as "correct".

Consider the following selection:

I found that I was not unique. Without nicotine to curb my appetite, I ate and ate, and, inevitably, my weight shot up.

The student reads it as:

I found then I was not ŭn-ī-cue. Without nī-cŏt-īne to curb my appetite, I ate and as, inability my weight shot up.

The instructor makes those notations on his copy of the selection:

I found that (then) I was not unique. Without nicotine to curb my appetite, I ate and (nie) and, inevitably, my weight shot up.
(as left out) (inability)

CONTINUED

EXHIBIT M
CONTINUED

word in selection	student word		type of error {A Attending, O Organization, K Knowledge}
that	then	A	student did not look closely
ū-nēke	ŭn-ī-cue	O & K	O - student broke as VC/V rather than V/CV K - didn't know "ique" at end of word = eke
nĭc-ō-tēne	nī-cŏt-īne	O & K	O - student chose possible but incorrect breakdown K - didn't know "i" can be pronounced "e"
ate	as	A	student did not look closely
and		A	carelessness
inevitably	inability	A & O	A - doesn't fit context, letters cannot represent student word O - length of word probably led to student choice to attack only first syllable

In decoding "inevitably", the student may try a variety of possible pronunciations:

ĭn-ē-vĭt-ă-bly ī-nē-vĭt-ă-bly ŭn-ē-vī-tă-bly ŭn-ĕv-ə-tă-bly etc.

If he applies the rules he has learned and is patient, he will eventually pronounce the word correctly (ĭn-ĕv-ə-tă-bly). If he does not recognize the word at this point, a lack of Knowledge of this word is implied.

Language Experience (Transcript)

EXHIBIT N-1

I didn't go to class yesterday because I called my wife and she said the check had come. So I went home and cashed the check so I could buy some food for my children. Then I worked on the car that won't start. The car is unbelievable. Something happened with the starting motor. I took the starting motor to check the solenoid and the solenoid was working perfectly. I checked the armature and it was perfect too. I put all the cables in the right place. I checked the battery, the coil, the cables in the distributor, the points, the condenser, the plugs and the starter switch. We tried to start the car by pushing and we pushed the car for three or four blocks. It didn't start. The owner was really mad. It's not my fault really; I tried everything I could. It is unbelievable.

Language Experience (Exercise)

EXHIBIT N-2

called

I didn't go to CLASS yesterday because I ~~SAID~~ called my wife and she ~~SAID~~ the check had come. So I went HOME and cashed the check so I could buy some FOOD for my children. Then I worked ON the car that won't start. The car is UNBELIEVABLE Something happened WITH the starting motor. I took the starting motor to check the solenoid and the solenoid was working PERFECTLY. I checked the armature and it was WORKING too. I put all the cables in the right place. I checked the battery, the coil, the CABLES in the distributor, the points, the condenser, the plugs and starter MOTOR. We tried to start the car by pushing and we PUSHED the car for three or four blocks. It didn't start. The OWNER was really mad. It's not my fault really; I tried everything I ~~KNEW~~ could It is unbelievable.

Present tense	Past Tense
don't	didn't
call	called
happen	HAPPENED
try	TRIED

neg { can't - pres / couldn't - past

pos { can - present / could past

m A d g O t O O k

pl U g h O me c O ¢ l

c A shed c A ble p O I nts

ch E ck Ed

n O t

A.C.E. Free Writing Rate

EXHIBIT 0-1

Name James Reynolds Date 5/16/77

Time: Start 10:25 Finish 10:26 Total 1 minute

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30

Note: Each stroke constitutes a movement.
"4" is one movement.
"27" is two movements.

Mastery is indicated by a free writing rate of 60 movements/minute.

ILLUSTRATION OF TIMED TESTS

EXHIBIT O-2

Note: Mastery is indicated by a rate of 30 strokes/minute
Count only correct digits as strokes

63 × 7 = 441	21 × 3 = 63	10 × 6 = 60	19 × 5 = 95	65 × 1 = 65	43 × 4 = 132	59 × 9 = 531	81 × 2 = 172
			↑ two strokes				↑ two strokes
14 × 1 = 14	29 × 0 = 0	63 × 6 = 318	99 × 5 = 495	20 × 3 = 60	47 × 2 = 104	19 × 7 = 133	38 × 8 = 304
		↑ three strokes			↑ one stroke		

TOTAL = 37

$$365\overline{)10654} = 29 \text{ R } 69$$

1730
3354
3285
69

$$229\overline{)92076} = 402$$

← three strokes

956 ← three strokes
476 ← three strokes
458 ← three strokes
18 ← two strokes

$$476\overline{)53999} = 113$$

476
639
476
1639
1428
211

TOTAL = 46

4692	1125	9495	5127	5120
9900	6325	1653	8844	4996
4396	7119	3791	1079	8729
+1248	+4903	+1197	+2033	+3411
20236	19472	16136	16083	24266
		↑ five strokes	↑ four strokes	↑ three strokes
2269	7851			
3401	2345			
2906	5791			
+6341	+1206			
14717	17182			
	← three strokes			

TOTAL = 30

ACE QUESTIONNAIRE

DATE OF INTERVIEW_____ LOCATION OF INTERVIEW_____

DOT OCCUPATION TITLE_____ DOT CODE_____

COMPANY/ORGANIZATION_____

ADDRESS_____ PHONE NUMBER_____

PERSON INTERVIEWED_____
Name Title

DOT GED LEVEL_____

NOTES TO INTERVIEWER:

- The purpose of this questionnaire is to determine, by questioning, the Math and Communication skills and people skills which are used on the job and, of those, which ones were required on entry to the job, and to collect as many examples of the Math and Communication skills required by the job.
- SKILLS HELD BUT NOT USED ON THE JOB ARE NOT TO BE RECORDED.
- MAKE NO ASSUMPTIONS. SKILLS USED ON THE JOB ARE FREQUENTLY DIFFERENT FROM WHAT YOU MAY EXPECT.
- Make notes and comments on generic skills not listed in the questionnaire.
- If the interviewee does not understand a question, rephrase it.
- Request information on the relationship of the task to the overall job.
- If in doubt about a response, ask for an example or for an explanation of the skill used.
- Specify the exact application of the skill used where you consider it appropriate.

Adult Competency Education Project
The Career Preparation Centers
609 Price Avenue
Redwood City, California 94063

This questionnaire was adapted from the Generic Skills work of Arthur Smith and Walter Kawulz, Training Research and Development Station Department of Manpower and Immigration, Prince Albert, Saskatchewan and revised by Glenn Vaughan and Joe Cooney in 1975 for the ACE project. It was later expanded to elicit information relevant to the skills added to the ACE Taxonomy of Instructional Objectives by Michael Malone.

GENERIC DATA & PEOPLE SKILLS QUESTIONNAIRE

INSTRUCTIONS

1. Review notes to interviewer (front cover).

2. Explain the purpose of the interview to the respondent.

3. Remove the interviewee guide from this questionnaire and give it to the respondent to examine during the interview.

4. Reading

   a. Read all lead statements and items to the respondent unless otherwise indicated on the questionnaire.

   b. DO NOT read boxed headings as they are meant to guide the interviewer in the question content.

   c. DO NOT read items printed in block letters. These items should be presented to the respondent for examination and selection.

5. Rephrasing

   a. This questionnaire has been written for the worker in an occupational area. The same questionnaire is to be used for the worker's supervisor's interview with a minimum of modification.

      For example:

      the question: In which of the following ways do you use numbers in your work?

      becomes: In which of the following ways does (name the worker) use numbers in (his, her) work?

   b. If the respondent tells you to rephrase an item re-read the question first then, if necessary, rephrase the question for clarification. Be sure to maintain the content of the item.

6. Recording

   Demographic Information: Be sure to complete the form on the cover page of this questionnaire. In order to ensure a high degree of accuracy and consistency in the transfer of this information:

   (1) use the pens provided

   (2) print requested material on cover page

USE NUMBERS *Most employees use numbers to some degree in their work. Although some of the answers to the following may seem obvious, we would like to completely assess the use of numbers.*

In which of the following ways do you use numbers in your work:

GET EXAMPLES

		Skill or performing the job	FREQUENCY OF SKILL USE Fre. 1/day+	Mod. <1/wk.	Sel. >1/wk.	THE ACTIVITY WHERE TASK IS REQUIRED (Include language of job)
Whole Numbers						
1A.1	Copy					
1A.2-3	Read					
1A.4	Write					
1A.5	Count					
1B.1-6	Add or Subtract					
1C.1-6	Multiply or Divide					
1D.1	Combination of functions					
1E.1	Round Off					
Fractions						
2A.1-3	Read					
2A.4-8	Write					
2B.1-10	Add or Subtract					
2C.1-7	Multiply or Divide					
2D.1	Combination of functions					
Decimals						
3A.1	Read					
3A.2-3	Write					
3B.1-4	Add or Subtract					
3C.1-7	Multiply or Divide					
3D.1	Round Off					
3E.1-12	Use decimals only with respect to dollars and cents					
3F.1-2	Combination of functions					

		Skills for performing the job	FREQUENCY OF SKILL USE Fre. 1/day+	Mod. ≤1/wk.	Sel. ≥1/wk.	THE ACTIVITY WHERE TASK IS REQUIRED (Include language of job)
Percent						
4A.1-2	Read					
4B.1	Do you solve problems like determining % of a number (5% of 3.00)					
4B.2	Do you solve problems like % one number is of another number (75 is ___ % of 90).					
4B.3	Do you solve problems like determining a number when a % of it is known (10% of __=70).					
4C.1-5	Do you solve word problems involving percentage					
Equivalents						
5A.1	Does your work involve changing fractions to decimals. Fractions: (Ex. 1/4 = .25)					
5A.3	Does your work involve changing decimals to percent. Decimals: (Ex. .5 = 1/2, or 50%)					
5A.2-5	Percentages: (Ex. 5% = .05, or 1/20)					
Solve Problems						
5B.1-2	Do you solve problems like finding the average of a group of numbers					
5B.3-11	In your work, do you ever have to select the math operations, and if more than one, decide the order in which they are done					
Ratio and Proportion						
5C.1-3	Do you use ratio to show comparisons between two numbers: Ex. gas oil mix 16:1, or compression ratio 8:1.					
5D.1-4	Do you use proportion to solve problems like 4:6 = 3: ( )? For example 4 gallons of gas requires 40 oz. of oil. How much oil would be needed for 3 gallons $\frac{4}{40} = \frac{3?}{(\ )}$					
5E.1	Do you solve Distance, Rate & Time problems					

Areas, Perimeters and Volumes		Skills for performing the job	*FREQUENCY OF SKILL USE Fre. 1/day+	Mod. ≥1/wk.	Sel. ≥1/wk.	THE ACTIVITY WHERE TASK IS REQUIRED (include language of job)
6A.1-9	Does your work involve the calculation, measurement or estimation of:					
	Areas -					
6B.1-7	Perimeters -					
6C.1-5	Volumes (specify) -					
6D.1-4	Capacity					
6E.1-3	Weight					
6G.1-7	Time					
6H.1-5	Costs					
6I.1-4	Conversion of English measurements					
Algebra	In your work do you:					
7A.1-3	use algebraic symbols					
7B.1-10	use directed numbers					
7C.1-2	use formulas					
7D.1-3	solve 1-variable sentences					
7E.1-16	work with series and progressions					
7F.1-11	work with exponents					
7G.1-9	factor expressions					
7H.1-7	find roots of numbers					
7I.1-6	solve equations by graphing					
7J.1-7	solve 2-variable sentences					
7K.1-3	work with matrices					
7L.1-9	use combinations and permutations					
7M.1-14	use probabilities					
7N.1-9	use number bases other than 10					
7O.1-11	work with number sets					
7P.1-17	use group theory					

		Skills for performing the job	FREQUENCY OF SKILL USE Fre. 1/day+<1/wk.	Mod. >1/wk.	Sel.	THE ACTIVITY WHERE TASK IS REQUIRED (Include language of job)
MEASUREMENT	*Many employees have involvement with measurement. Stenographers may be involved with weight, when using postage meters, and carpenters with length.*					
	In your measurements do you read:					
8A.1-6	Postage meters, weigh scales, thermometers, or other measuring devices					
8A.7	Do you use vernier scales such as micrometers					
	In your work do you make conversions from English to Metric measurement:					
9A.1-4	Kilometres to miles metres to yards(or reverse)					
9B.1-2	centimetres to inches					
9C.1-4	Kilograms grams to pounds(or reverse)					
9D.1-2	centigrams to ounces					
9E.1-4	Litres to cubic inches					
9F.1-2	Millilitres to cubic feet CC's to quarts(or reverse) gallons bushels					
9G.1-5	Temperature Conversion					
10A.1	Does your work involve the reading of graphs (as shown below)					
10B.1	Do you construct (draw) graphs (as shown below)					

		Skills for performing the job	FREQUENCY OF SKILL USE Fre. 1/day+	Mod. <1/wk.	Sel. >1/wk.	THE ACTIVITY WHERE TASK IS REQUIRED (Include language of job)
MATHEMATICAL DRAWINGS						
	Some jobs involve mathematical drawings. This may ask for simple recognition. For example, a driver may have to recognise road symbols and a draftsman will not only have to recognise mathematical drawings but produce them.					
11A.1-9	In your work do you have to make use of common objects such as circles, triangles, spheres, rectangles, squares, etc.					
11B.1-14	In your work do you use common angles such as 15, 30, 45, 90.					
11C.1-4	Do you draw, sketch, or form these figures					
12A.1-4	Do you read scale drawings such as blueprints					
	Blueprint					
12B.1-3	Do you make scale drawings using scale ruler					
12C.1-	Do you take measurements from scale drawings					
12D.1	Do you have to read assembly drawings					
12E.1	Do you have to read schematic drawings					
12F.1-2	Do you have to read shop drawings					
	Schematic					

READING

Reading to some degree is applied in all occupations. In this section we are interested in not only what is read but why things are read.

GET EXAMPLES

		Skills for performing the job	FREQUENCY OF SKILL USE Fre. 1/day+	Mod. <1/wk.	Sel. >1/wk.	THE ACTIVITY WHERE TASK IS REQUIRED (include language of job)
	In your work do you read:					
13A.1-2	Letters of the Alphabet					
15B.1	Functional signs					
16A.1-4	Forms such as work orders, job orders, vouchers, claims, purchase orders.					
16B.1-3	Charts (excluding maps, lists and two column tables)					
16C.1	Notes, Letters and Memos					
16D.1-6	Policy manuals, regulations and instructions					
16E.1-3	Newspaper					
16F.1-7	The Dictionary					
16G.1-9	Maps					
16H.1-3	Contracts					
	In reading and listening the skills of literal, interpretive and evaluative comprehension apply. Literal comprehension would require knowing the facts, interpretive comprehension would require knowing purposes and meaning. Evaluative comprehension requires the skill of using judgment.					
	Which of the following best describes the reading you do in your work					
17A.1-13	LITERAL READ FOR SPECIFIC FACTS SUCH WRITTEN MATERIALS AS TELEPHONE BOOKS, DICTIONARIES, ETC.					
18A.1-12	INTERPRETIVE READ WRITTEN MATERIALS THAT REQUIRE YOU TO GENERALIZE, EXPLAIN OR MAKE COMPARISONS. EX. YOU READ A STATEMENT IN YOUR POLICY MANUAL AND EXPLAIN THE STATEMENT TO OTHERS.					
18B.1-8	EVALUATIVE JUDGE VALUE OR USEFULNESS OF WRITTEN MATERIAL.					

			Skills for performing the job	FREQUENCY OF SKILL USE Fre. 1/day+	Mod. <1/wk.	Sel. >1/wk.	THE ACTIVITY WHERE TASK IS REQUIRED (Include language of job)
	Which of the following best describes the listening you do in your work						
19A.1-15	LITERAL	LISTEN FOR SPECIFIC FACTS OR DIRECTIONS. EX. YOUR SUPERVISOR GIVES YOU A ONE-STEP ORAL INSTRUCTION AND YOU CARRY IT OUT.					
19B.1-9	INTERPRETIVE	RECEIVE ORAL INSTRUCTIONS OR INFORMATION THAT REQUIRE YOU TO UNDERSTAND OPINIONS, PURPOSES AND INTENTIONS. EX. YOUR SUPERVISOR GIVES YOU GENERAL INSTRUCTIONS AND YOU INTERPRET EXACTLY WHAT IS TO BE DONE.					
19C.1-13	EVALUATIVE	JUDGE VALUE OR USEFULNESS OF ORAL INFORMATION. EX. A CUSTOMER TELL YOU HOW YOUR PRODUCT OR SERVICES MIGHT BE IMPROVED AND YOU ACT WITH JUDGEMENT.					
WRITING	*We would like to know to what extent writing is involved in various occupations. Some people may only fill in forms with words or phrases while others may compose lengthy written works.*						
	In your work do you:						
20A.1	Write letters of the alphabet						
20B.1-6	Copy text						
21A.1-8	Write names, addresses and time						
	In your work do you fill in or complete forms using:						
22A.1	Short phrases and/or figures						
22B.1-8	Sentences						
22D.1	Do you write letters or notes						
22E.1-4	Do you make notes of information or directions received orally						
22F.1-8	Do you write paragraphs						
22G.1-2	Do you write (compose) internal memos or letters						

		Skills for performing the job	FREQUENCY OF SKILL USE Fre. 1/day+	Mod. 1/wk.	Sel. >1/wk.	THE ACTIVITY WHERE TASK IS REQUIRED (include language of job)
	We would like to know if the job requires preparation of reports. We want to know the degree of skill necessary to write the reports. Is the report just factual where the writer is given all the information or does the report require research and judgement?					
22H.1	Do you write purchase orders					
23A.1	Do you write form letters					
23B.1	Do you write business letters					
TALKING	*We are also concerned about oral (word of mouth) communication required to carry out job functions.*					
	In your work is you:					
25A.1-6	give out information					
25B.1-3	usually talk to individual persons					
25C.1-6	use the telephone					
25D.1-5	give directions					
SORTING/CLASSIFYING	*This section asks about the tasks of sorting information and sorting objects by set lists or procedures. Further, we would like to know the individual involvement in setting these lists and procedures.*					
	In your work do you:					
26A.1	Sort information by a given list, e.g., -sort and file correspondence -sort vouchers by types -sort expenditures or receipts					
26B.1	Sort parts, tools, equipment or products					
26C.1	Set up lists for sorting the information or objects					
26D.1	-prepare forms to record correspondence, telephone call, or list of visitors -prepare sub-headings or breakdowns for expenditures or receipts. -prepare forms to record information you believe others have a need to know -prepare file systems					

		Skills for performing the job	FREQUENCY OF SKILL USE Fre. 1/day+	Mod. 1/wk.	Sel. 1/wk.	THE ACTIVITY WHERE TASK IS REQUIRED (include language of job)
DECISION MAKING AND RESPONSIBILITY	*How much freedom and involvement does an employee have in deciding the means to carry out tasks and in deciding the products of his tasks? What degree of difficulty does increased freedom bring? In each section are three or four statements. We ask you to read each section and choose the statement in each that most nearly describes your tasks.*					
Tools, Equipment and Materials						
27A.1	Are all tools, equipment and materials specified and you have no choice in what to use					
	Some are specified. For others you use guides such as manuals to help you decide.					
27B.1-3	You have to decide, without direction or guides, which tools, equipment or materials to use.					
Procedures and Methods						
	All procedures and methods are specified and you have no choice in the procedures or methods used.					
27C.1-3	Some are specified. For others you use guides such as manuals and operating procedures to help you decide on methods and procedures.					
	You have to decide, without direction or guides which methods and procedures to use.					